SECTION1 SUMMARY
KEY TO ABBREVIATIONS

A	AC	:Alternating Current
	ACC	:Automatic Color Control
	ACSS	:Automatic Channel Setting System
	ADJ	:Adjust
	A/E	:Audio Erase
	AFC	:Automatic Frequency Control
	AFT	:Automatic Fine Tuning
	AGC	:Automatic Gain Control
	A.H.SW	:Audio Head Switch
	ALC	:Automatic Level Control
	AM	:Amplitude Modulation
	AMP	:Amplifier
	ANT	:Antenna
	APC	:Automatic Phase Control
	ASS'Y	:Assembly
	AUX	:Auxiliary
B	B	:Base
	BGP	:Burst Gate Pulse
	BPF	:Bandpass Filter
	BS	:Brodcasting Satellite
	BW or B/W	:Black and White
C	C	:Capacitor, Chroma, Collector
	CAN	:Cancel
	CAP	:Capstan
	CAP.BRK	:Capstan Brake
	CAP.RVS	:Capstan Reverse
	CATV	:Cable Television
	CBA	:Circuit Board Assembly
	CCD	:Charge Coupled Device
	C.CTL	:Chro Control, Capstan Control
	CFG	:Capstan Frequency Generator
	CHROMA	:Chrominance
	CNR	:Chroma Noise Redution
	COMB	:Combination Comb Filter
	COMP	:Comparator Composite Compensation
	CONV	:Converter
	C.ROT SW	:Color Rotary Switch
	CS	:Chip Selcet
	C.SYNC	:Composite Synchronization
	CTL DIV	:Control Divide
	CUR	:Current
	CYL	:Cylinder
D	D	:Drum, Digital, Diode, Drain
	D.ADJ	:Drum Adjust
	DC	:Direct Current
	D.CTL	:Drum Control
	DEMOD	:Demodulator
	DET	:Detector
	DEV	:Deviation
	DHP	:Double High Pass
	DIGITRON	:Digital Display Tube
	DL	:Delay line
	DOC	:Drop Out Compensator
	DUB	:Dubbing
	D.V SYNC	:Dummy Vertical Synchronization
E	E	:Emitter
	EE	:Electric to Eletric
	EMPH	:Emphasis
	ENA	:Enable
	ENV	:Envelope
	EP	:Extended Play
	EQ	:Equalizer
	EXP	:Expander
F	F	:Fuse
	FB	:Feed Back
	FBC	:Feed Back Clamp
	FE	:Full Erase
	FG	:Frequency Generator
	FL	:Filter
	FM	:Frequency Modulation
	F/R	:Front/Rear
	FS	:Frequency Synthesizer
	FSC	:Subcarrier Frequency
	F/V	:Frequency Voltage
G	GEN	:Generator
H	H	:High, Horizontal
I	IC	:Integrated Circuit
	IF	:Intermediate Frequency
	INS	:Insert
L	L	:Low, Left, Coil
	LD	:LED
	LD VTG CTL	:Loading Voltage Control
	LECHA	:Letter Character
	L.M	:Level Meter
	LP	:Long Play
	LPF	:Low Pass Filter
M	MAX	:Maximum
	MD	:Modulator
	MECHA.CTL	:Mechanism Control
	MIC	:Microphone
	MIN	:Minimum
	MIX	:Mixer, Mixing
	M.M.	:Monostable, Multivibrator
	MMV	:Mono Multi Vibrator
	MOD	:Modulation, Modulator
	MODEM	:Modulator-Demodulator
	MPX	:Multiplex
N	NR	:Noise Reduction
O	OSC	:Oscillator
	OSD	:On Screen Display
P	PB	:Playback
	PCB	:Printed Circuit Board
	P.CTL	:Power Control
	PRE-AMP	:Preamplifier
	P.F	:Power Failure
	PG	:Pulse Generator
	PLL	:Phase Locked Loop
	PREM.DET	:Premire Detect
	P.P	:Peak-to-Peak
	PS	:Phase Shift
	PWM	:Pulse Width Modulation
	PWR CTL	:Power Control
Q	Q	:Transistor
	QH	:Quasi Horizontal
	QSR	:Quick Setting Record
	QTR	:Quick Timer Record
	QV	:Quasi Vertical
R	R	:Resistor, Right
	RE(or RC)	:Remocon, Receiver
	REC	:Recording
	REC S 'H'	:Record Start 'Hight'
	REF	:Reference
	REG	:Regulated, Regulator
	REMOCON	:Remote Control(unit)
	RF	:Radio Frequency
	R/P	:Record/Playback
	RTC	:Reel Time Counter
S	S	:Serial
	S.ACCEL	:Slow Accel
	SAOP	:Second Audio Program
	SC	:Scart, Simulcast
	S.DET	:Secam Detect
	SH	:Shift
	SHARP	:Sharpness
	SIF	:Sound Intermediate Frequency
	SLD	:Side Locking
	S/N	:Signal to Noise Ratio
	SP	:Standard Play
	ST	:Stereo
	SUB	:Subtract, Subcarrier
	SW or S/W	:Switch
	SYNC	:Synchronization
	SYSCON	:System Control
T	T	:Coil
	TP	:Test Point
	TR	:Transistor
	TRK	:Tracking
	TRANS	:Transformer
	TU	:Tuner, Take-up
U	UHF	:Ultra High Frequency
	UNREG	:Unregulated
V	V	:Volt, Vertical
	VA	:Always Voltage
	VCO	:Voltage Controlled Oscillator
	VGC	:Voltage Gain Control
	VHF	:Very High Frequency
	V.H.SW	:Video Head Switch
	VISS	:VHS Index Search
	VPS	:Video Program System
	VR	:Variable Resistor or Volume
	V-SYNC	:Vertical Synchronization
	VTG	:Voltage
	VV	:Voltage to Voltage
	VXO	:Voltage X-tal Oscillator
W	W	:Watt
	WHT	:White
	W/O	:With out
X	X-TAL	:Crystal
Y	Y/C	:Luminance/Chrominance
	YNR	:Luminance Noise Reduction
Z	ZD	:Zener Diode

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, the products are strictly inspected to confrom with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

• Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (⩛) parts are critical for safety.
   Replace only with specified part numbers.
   Note : Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use Specified internal wiring. Note especially:
   1) Double insulated wires
   2) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistor

5. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

6. Check that replaced wires do not contact sharp edged or pointed parts.

7. 1) When a power cord has been replaced, check that A mark is made on the cord, under strain, near the aperture, and the flexible cord is subjected 100 times to a pull of 40N for a duration of 1 second each.
   2) During the test, the cord shall not be displaced by more than 2mm

8. Also check areas surrounding repaired locations.

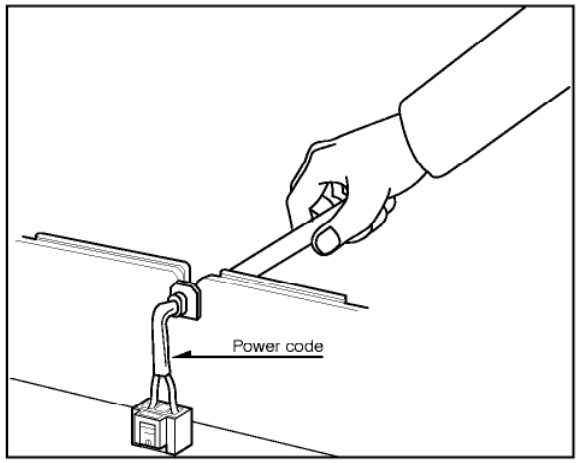


Fig. 1

SAFETY CHECK AFTER SERVICING

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

- **Insulation resistance test**

  confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, incrophone jacks, earphone jacks, etc.) See table below.

- **Dielectric strength test**

  Confirm specified dielectric strength or greater between power cord prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, incrophone jacks, earphone jacks, etc.) See table below.

- **Clearance distance**

  When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

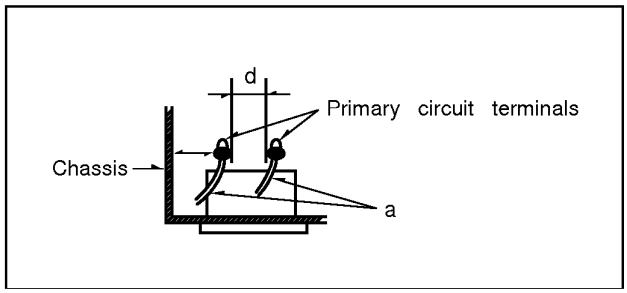


Fig. 2

Table 1 : Ratings for selected areas

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance(d),(d)
*100 to 130 V 200 to 240 V	Europe Australia	F 10 MΩ/500 V DC	4kV 1 minute	F 6mm(d) F 8mm(d) (a Power cord)

* Class II model only.

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

- **Leakage Current test**

  Confirm specified or lower leakage current between B(earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.)

  Measuring Method: (Power ON)
  Insert load Z between B(earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

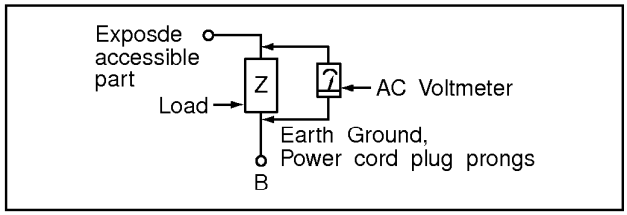


Fig. 3

Table 2:Leakage current ratings for selected areas.

AC Line Voltage	Region	Load Z	Leakage Current(i)	Earth Ground (B) to :
100 to 130 V	Europe	2kΩ	i E 0.7m A peak i E 2m A DC	Antenna earth terminals
200 to 240 V	Australia	50kΩ	i E 0.7m A peak i E 2m A DC	Other terminals

Note. This table is for IEC member only. Be sure to confirm the precise values for your particular country and locality.

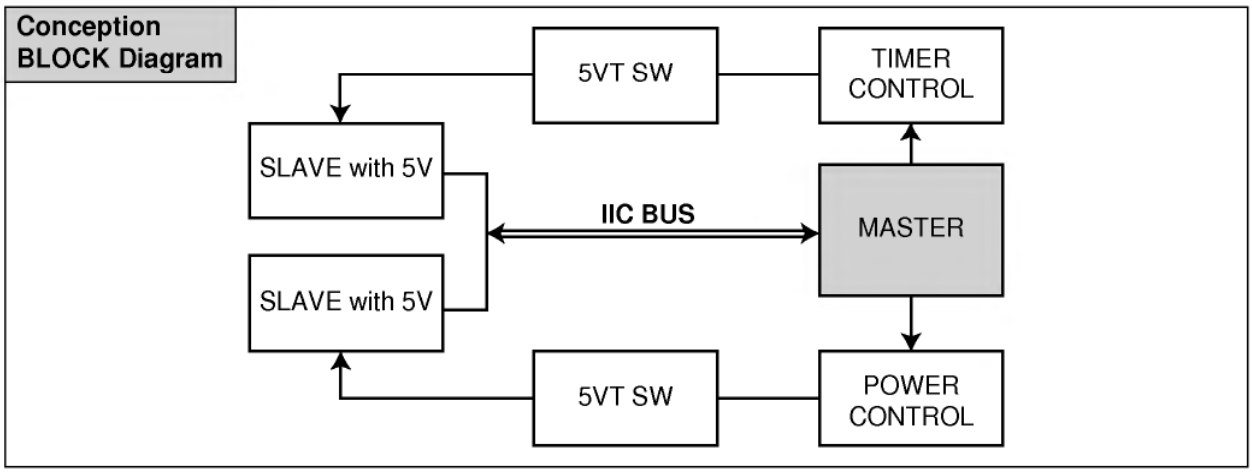
PROPOSAL FOR APPLYING SHORT PROTECTION

• The Contents of Examination

As all the IC that is applied to VCR is controlled by IIC, mutual communication, if Vcc of IC is short or open with detecting 'Acknowledge' data of the specific IC according to each power(5V, 5VT) μ-COM gets unable to detect 'ACK' data.

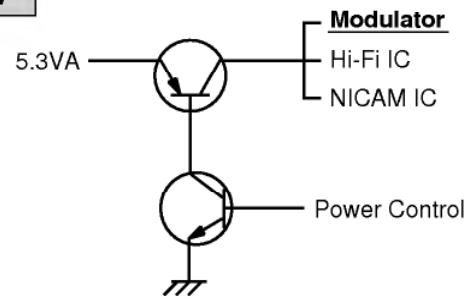
μ-COM regards this case as abnormal one and if it can't detect 'ACK' data for a certain time(3.5 sec) the signal of 'Power Control' and 'Timer Control' are switched to 'Low'. As a result POWER Switching TR is kept from generating heat and fire.

Conception BLOCK Diagram

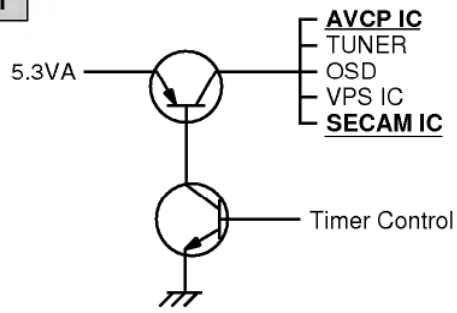


• POWER for each IC

5.2V



5.2VT



• IC to detect 'ACK' data is selected as below because IC is different in accordance to region and option

S/ Series	5V POWER	SECAM IC
	5VT POWER	AVCP IC
P/Y/I Series	5V POWER	Modulator
	5VT POWER	AVCP IC

*Short protection off mode : DJ01 Diode in

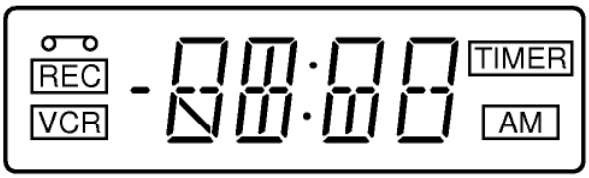
SERVICE NOTICE ON REPLACING EEPROM

In case that defective EEPROM of PAL models is replaced, to operate these sets from the initial state MP KEY must be repaired as well before delivering to the customer.
If MP KEY isn't repaired the setting of RF OUT channel or LANGUAGE might be different from that for custormer's country.

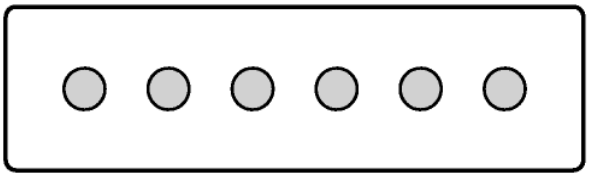
•**MP KEY** : In case of PAL VCR if holding the REC button on the front panel and the CLEAR button on the remote control handset for 5 ~ 7 seconds with power being switch all and no tapes,
OK is displayed at FLD for FLD models and LED becomes on for LED CLOCK models.
This is the state that initializing EEPROM is finished.
(In case of PAL VCP if holding the REC button on the front panel and the MENU button on the remote control handset for 5 ~ 7 seconds with power being off and no tapes, All the LED DOTs become on. This is the state that initializing EEPROM is finished.)

•**MP KEY's function** : MP KEY sets EEPROM's data up to the initial state.

• **FLD MODEL:**
MP KEY "OK"



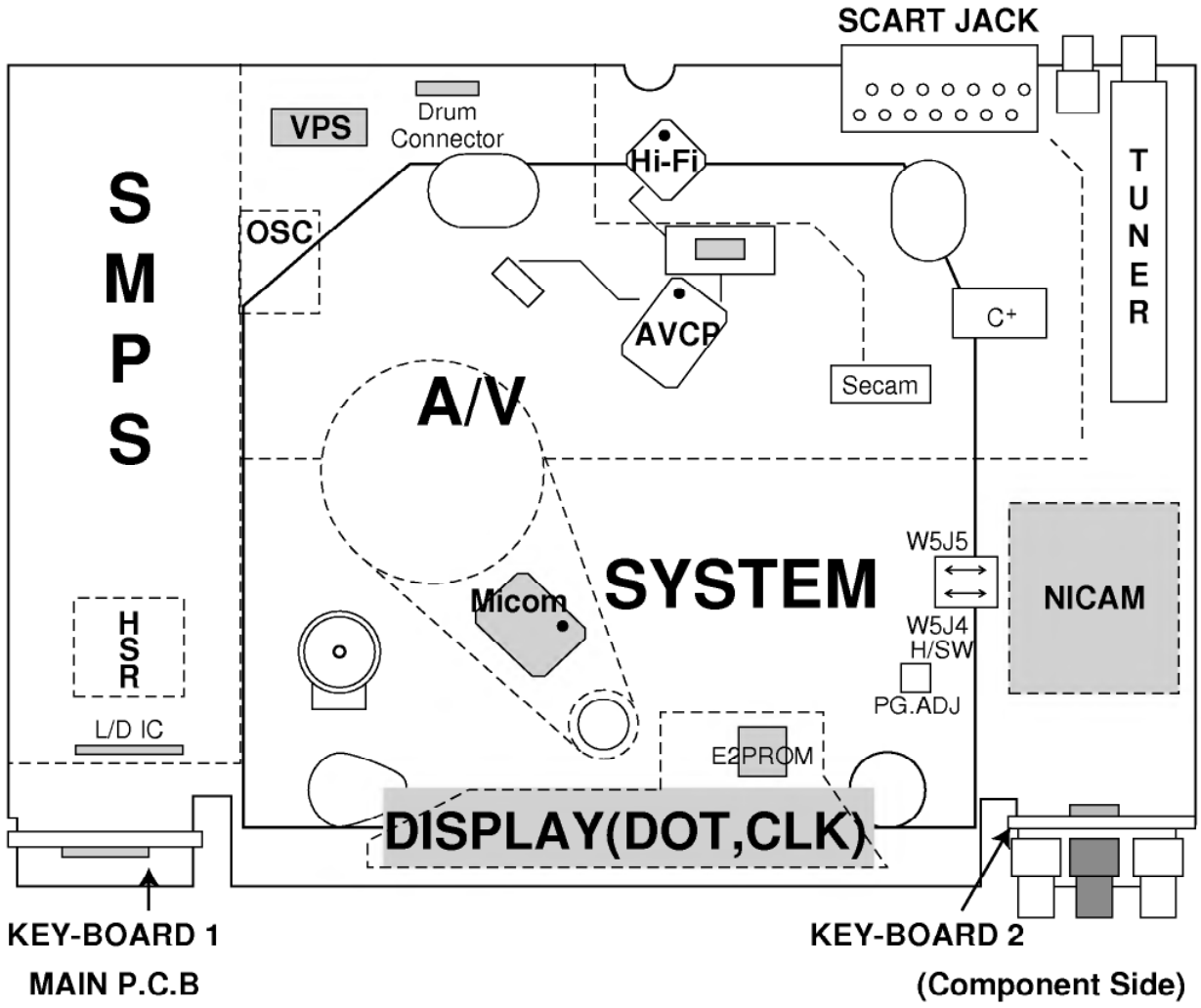
• **LED CLOCK MODEL:**
MP KEY Switch all on a Light



• **LED DOT MODEL:**
MP KEY Switch all on a Light

SECTION 3 ELECTRICAL
ELECTRICAL ADJUSTMENT POINTS ARRANGEMENT

: Measurement point
: Adjustment point



ELECTRICAL ADJUSTMENT PROCEDURES

1. Servo Adjustment

1) PG Adjustment

• Test Equipment

a) OSCILLOSCOPE

b) PAL TEST TAPE (VHS SP)

• Adjustment And Specification

MODE	MEASUREMENT POINT	ADJUSTMENT POINT	SPECIFICATION
PLAY	V.Out H/SW(W5J4, W5J5)	VR501	6.5 ± 0.5H

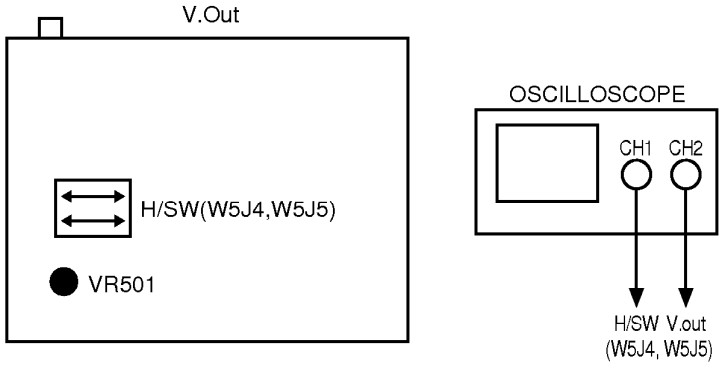
• **Adjustment Procedure**

a) Insert the PAL SP Test Tape and play.
Note - Adjust the distance of X, pressing the Tracking(+) or Tracking(-) when the "ATR" is blink after the PAL SP Test Tape is inserted.

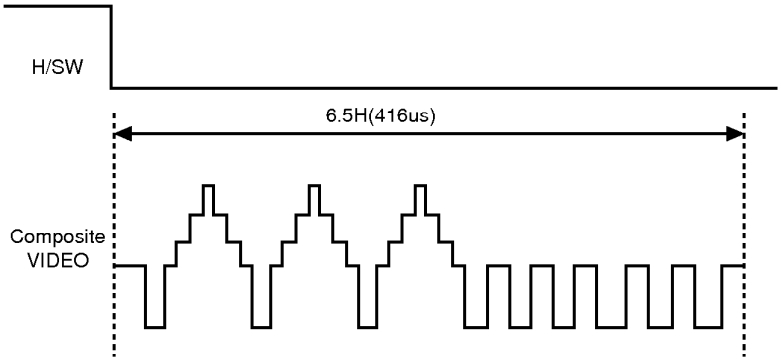
b) Connect the CH1 of the oscilloscope to the H/SW(W5J4, W5J5) and CH2 to the Video Out for the VCR.

c) Trigger the mixed Video Signal of CH2 to the CH1 H/SW(W5J4, W5J5), and then check the distance (time difference), which is from the selected A(B) Head point of the H/SW(W5J4, W5J5) signal to the starting point of the vertical synchronized signal, to 6.5H ± 0.5H (416μs, 1H=64.0μs).

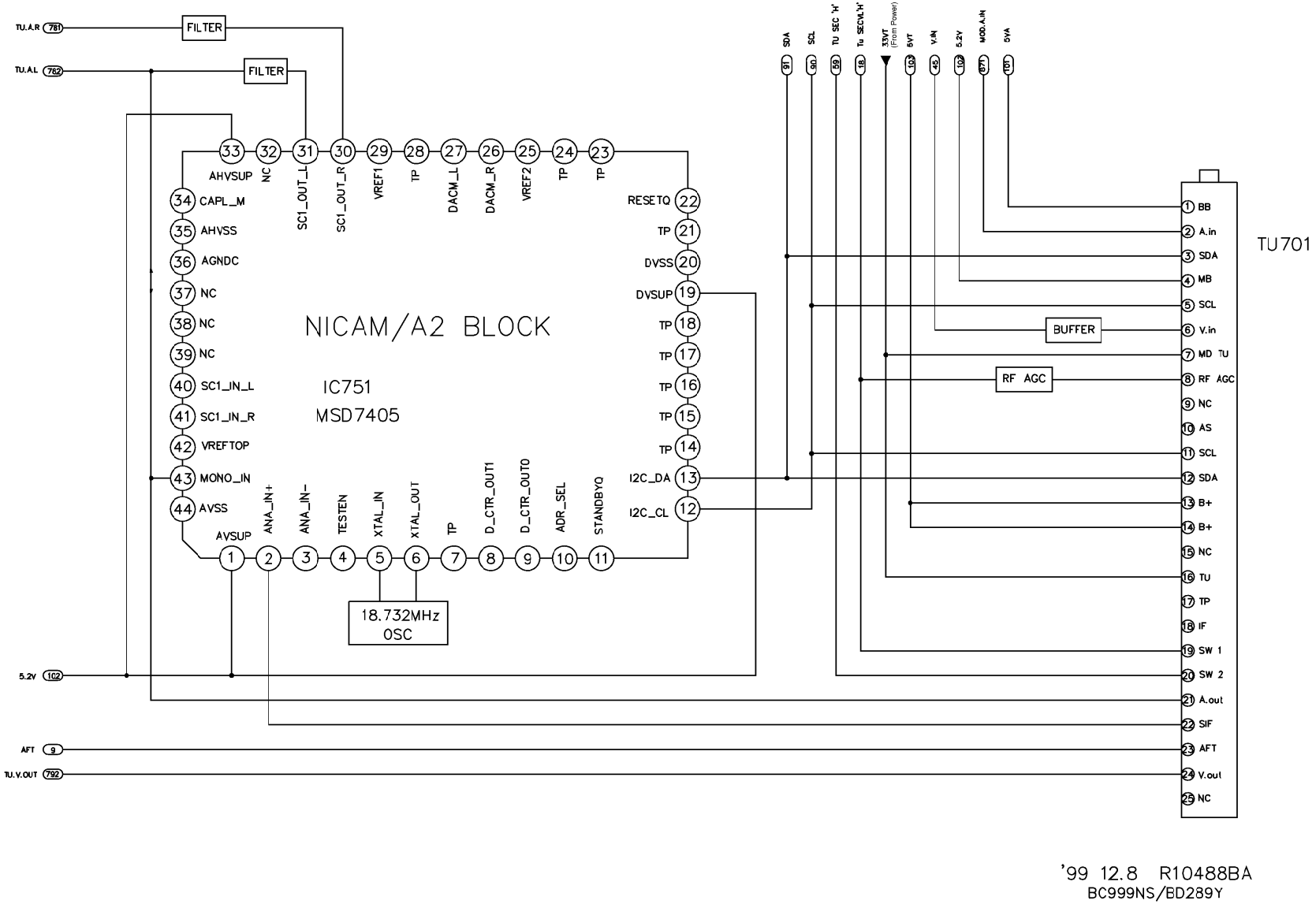
• **CONNECTION**



• **WAVEFORM**

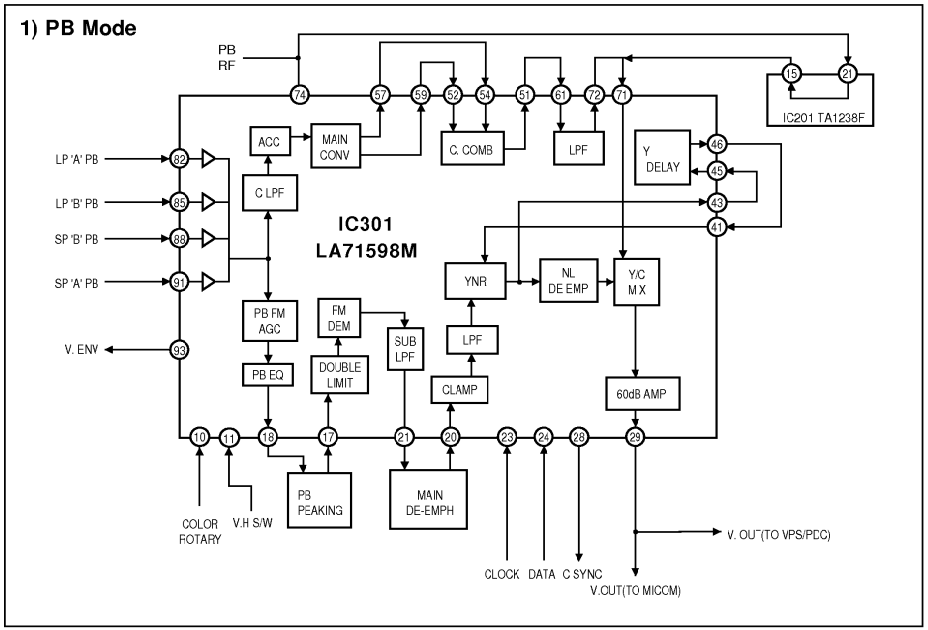


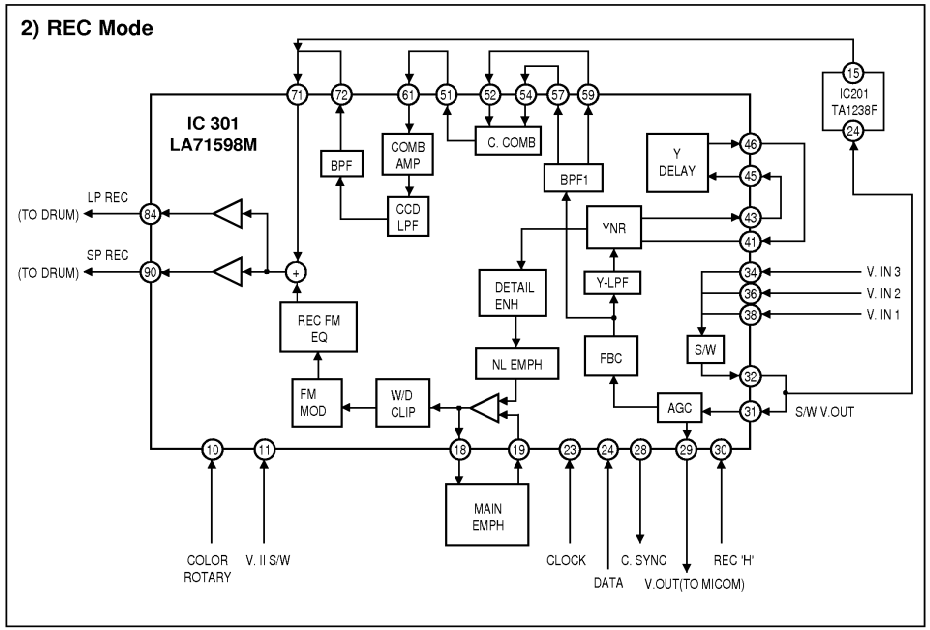
2. Tu/IF, NICAM & A2 Block Diagram



'99 12.8 R10488BA
BC999NS/BD289Y

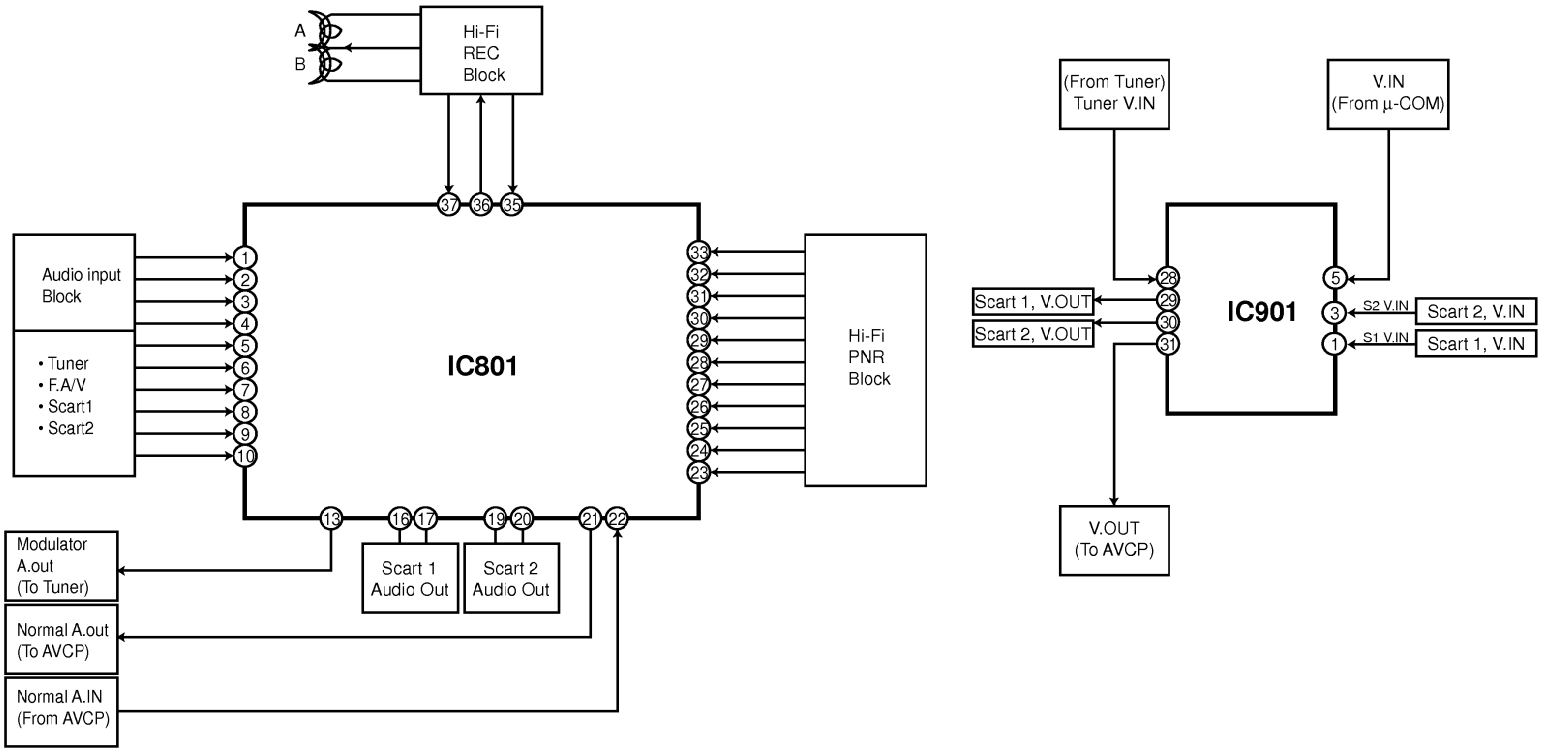
3. Y/C Block Diagram





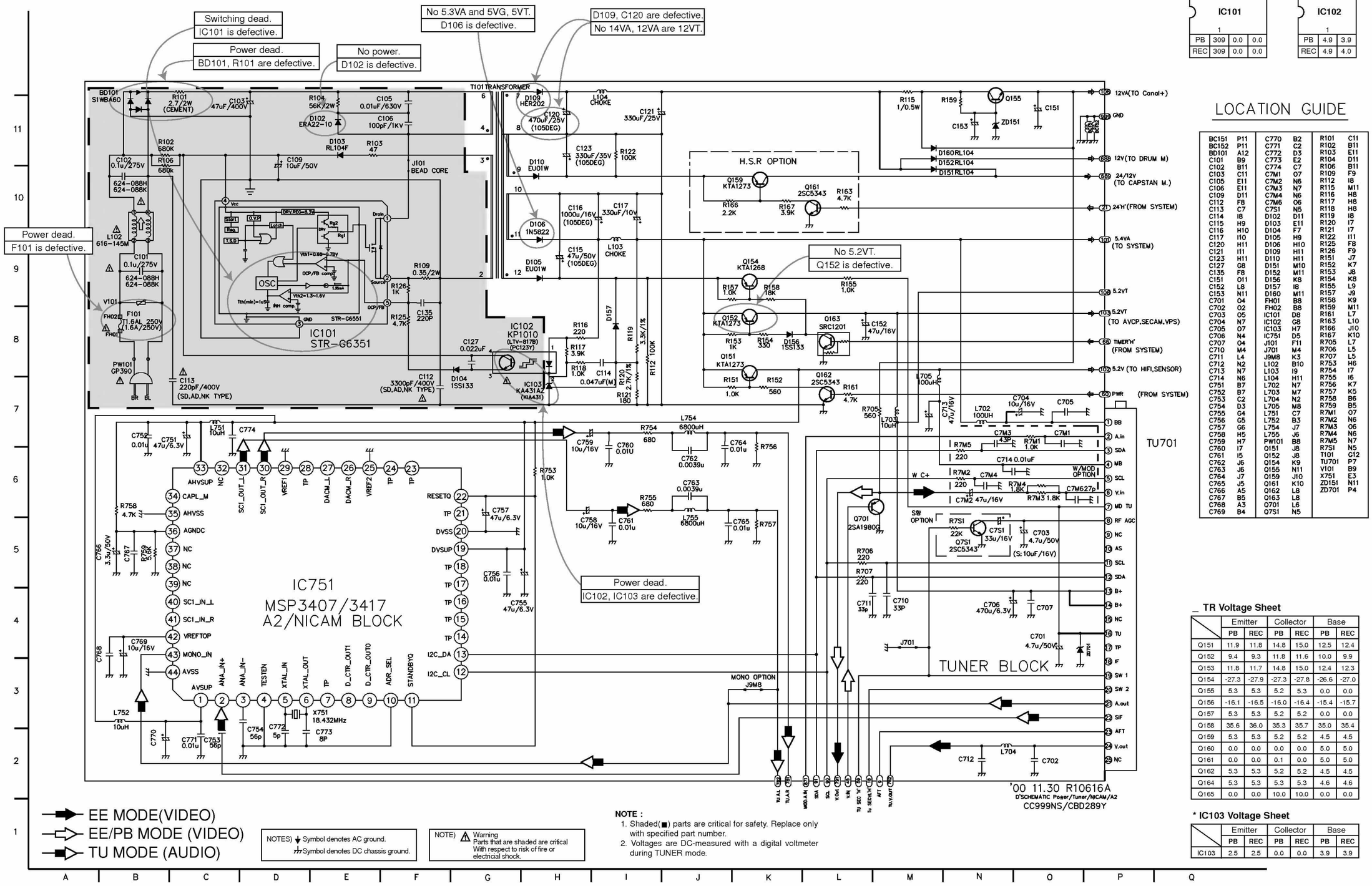
'00 11. 30 R10613A

5. Hi-Fi, SCART Block Diagram



CIRCUIT DIAGRAMS

1. Power, Tuner, NICAM/A2 Circuit Diagram



EE MODE(VIDEO)
EE/PB MODE (VIDEO)
TU MODE (AUDIO)

NOTES) ⏚ Symbol denotes AC ground.
⏚ Symbol denotes DC chassis ground.

NOTE) ⚠ Warning
Parts that are shaded are critical With respect to risk of fire or electricial shock.

NOTE :

1. Shaded(■) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during TUNER mode.

*** IC101 Voltage Sheet**

PB	16.1	4.0
REC	16.3	4.6
5	IC101	
1		
PB	309	0.0	0.0
REC	309	0.0	0.0

*** IC102 Voltage Sheet**

PB	4.0	0.0
REC	4.0	0.0
4	IC102	
1		
PB	4.9	3.9
REC	4.9	4.0

LOCATION GUIDE

BC151	P11	C770	B2	R101	C11
BC152	P11	C771	C2	R102	B11
BD101	A12	C772	D3	R103	E11
C101	B9	C773	E2	R104	D11
C102	B11	C774	C7	R106	B11
C103	C11	C7M1	O7	R109	F9
C105	E11	C7M2	N6	R112	I8
C106	E11	C7M3	N7	R115	M11
C109	D11	C7M4	N6	R116	H8
C112	F8	C7M6	O6	R117	H8
C113	C7	C7S1	N5	R118	H8
C114	I8	D102	D11	R119	I8
C115	H9	D103	E11	R120	I7
C116	H10	D104	F7	R121	I7
C117	I10	D105	H9	R122	I11
C120	H11	D106	H10	R125	F8
C121	I11	D109	H11	R126	F9
C123	H11	D110	H11	R151	J7
C127	G8	D151	M10	R152	K7
C135	F8	D152	M11	R153	J8
C151	O11	D156	K8	R154	K8
C152	L8	D157	I8	R155	L9
C153	N11	D160	M11	R157	J9
C701	O4	FH01	B8	R158	K9
C702	O2	FH02	B8	R159	M11
C703	O5	IC101	D8	R161	L7
C704	N7	IC102	G8	R163	L10
C705	O7	IC103	H7	R166	J10
C706	N4	IC751	D5	R167	K10
C707	O4	J101	F11	R705	L7
C710	M4	J701	M4	R706	L5
C711	L4	J9M8	K3	R707	L5
C712	N2	L102	B10	R753	H6
C713	N7	L103	I9	R754	I7
C714	N6	L104	H11	R755	I6
C751	B7	L702	N7	R756	K7
C752	B7	L703	M7	R757	K5
C753	C2	L704	N2	R758	B6
C754	D3	L705	M8	R759	B5
C755	G4	L751	C7	R7M1	O7
C756	G5	L752	B3	R7M2	N6
C757	G6	L754	J7	R7M3	O6
C758	H5	L755	J6	R7M4	N6
C759	H7	PW101	B8	R7M5	N7
C760	I7	Q151	J8	R7S1	N5
C761	I5	Q152	J8	T101	G12
C762	J6	Q154	K9	TU701	P7
C763	J6	Q155	N11	V101	B9
C764	J7	Q159	J10	X751	E3
C765	J5	Q161	K10	ZD151	N11
C766	A5	Q162	L8	ZD701	P4
C767	B5	Q163	L8		
C768	A3	Q701	L6		
C769	B4	Q7S1	N5		

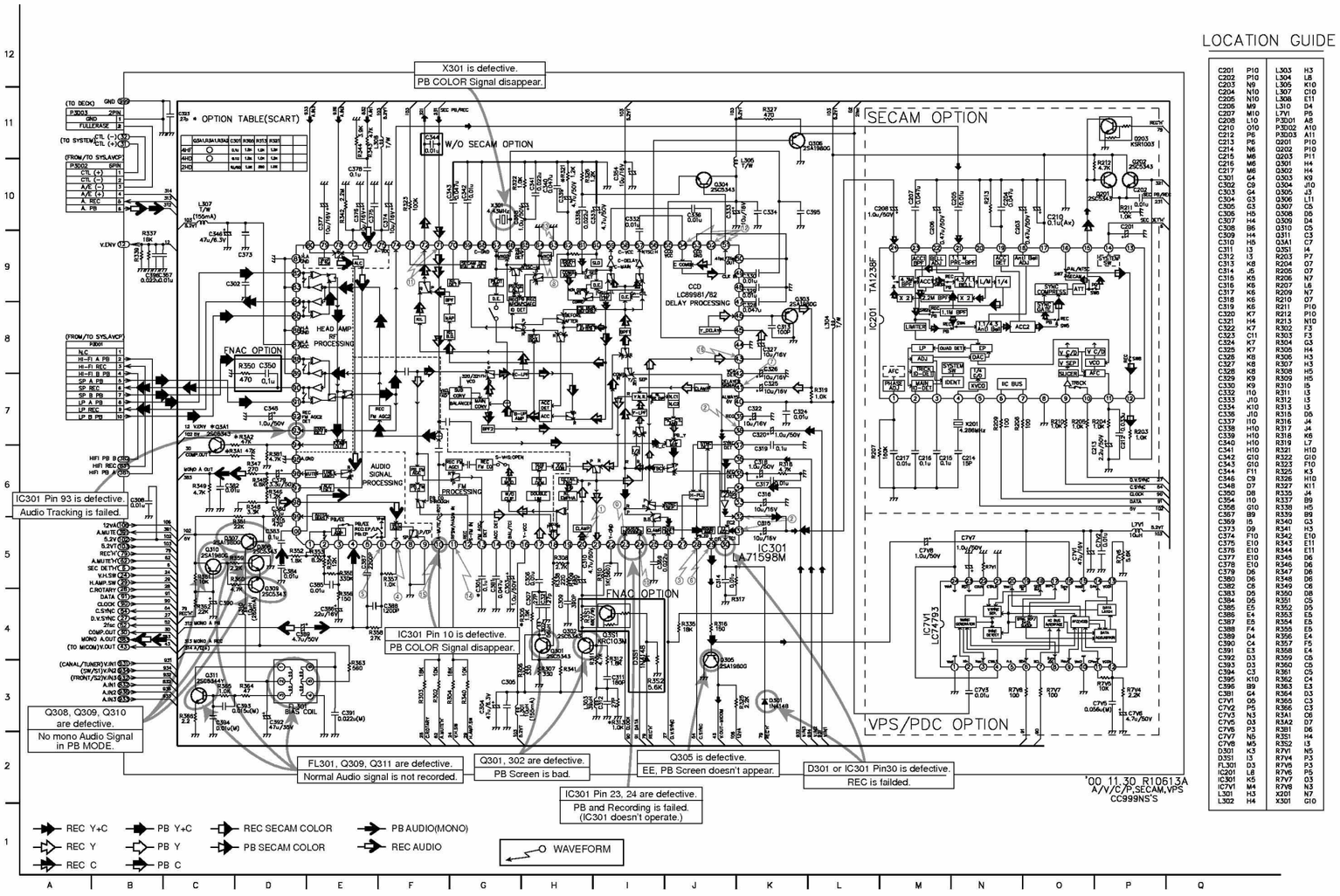
_ TR Voltage Sheet

	Emitter		Collector		Base	
	PB	REC	PB	REC	PB	REC
Q151	11.9	11.8	14.8	15.0	12.5	12.4
Q152	9.4	9.3	11.8	11.6	10.0	9.9
Q153	11.8	11.7	14.8	15.0	12.4	12.3
Q154	-27.3	-27.9	-27.3	-27.8	-26.6	-27.0
Q155	5.3	5.3	5.2	5.3	0.0	0.0
Q156	-16.1	-16.5	-16.0	-16.4	-15.4	-15.7
Q157	5.3	5.3	5.2	5.2	0.0	0.0
Q158	35.6	36.0	35.3	35.7	35.0	35.4
Q159	5.3	5.3	5.2	5.2	4.5	4.5
Q160	0.0	0.0	0.0	0.0	5.0	5.0
Q161	0.0	0.0	0.1	0.0	5.0	5.0
Q162	5.3	5.3	5.2	5.2	4.5	4.5
Q164	5.3	5.3	5.3	5.3	4.6	4.6
Q165	0.0	0.0	10.0	10.0	0.0	0.0

*** IC103 Voltage Sheet**

	Emitter		Collector		Base	
	PB	REC	PB	REC	PB	REC
IC103	2.5	2.5	0.0	0.0	3.9	3.9

2. A/V, SECAM, VPS Circuit Diagram

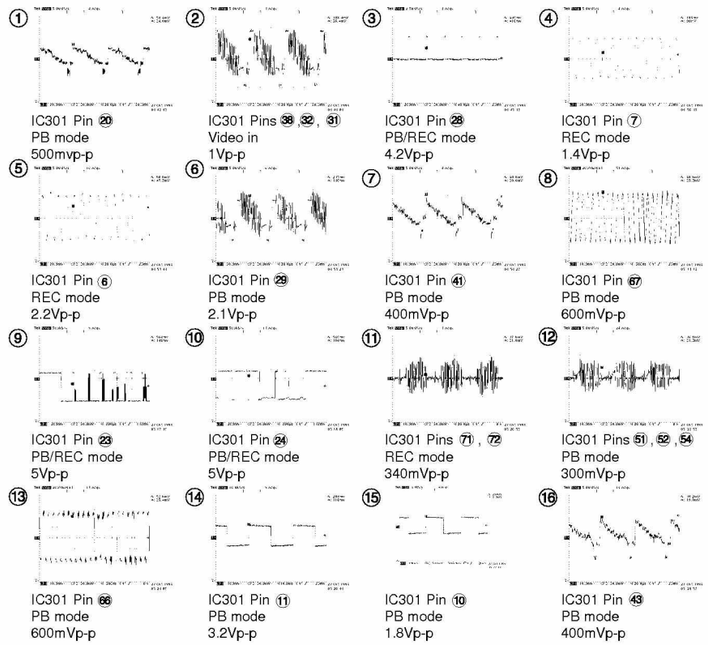


LOCATION GUIDE

C201	P10	L303	H3
C202	P10	L304	L8
C203	N9	L305	K10
C204	N10	L307	C10
C205	N10	L308	E11
C206	M9	L310	D4
C207	M10	L7V1	P5
C208	L10	P3D01	A8
C210	O10	P3D02	A10
C212	P6	P3D03	A11
C213	P5	Q201	P10
C214	N6	Q202	P10
C215	M6	Q203	P11
C216	M6	Q301	H4
C217	M6	Q302	H4
C301	G4	Q303	K9
C302	G9	Q304	J10
C303	G4	Q305	J5
C304	G3	Q306	L11
C305	G5	Q307	G5
C306	H5	Q308	G5
C307	H4	Q309	D4
C308	B6	Q310	G5
C309	H4	Q311	G3
C310	H5	Q3A1	C7
C311	I3	Q351	I4
C312	I3	R203	P7
C313	K8	R204	O7
C314	J5	R205	O7
C315	K5	R206	N7
C316	K6	R207	L6
C317	K6	R209	N7
C318	B6	R210	O7
C319	K6	R211	P10
C320	K6	R212	P10
C321	H4	R213	N10
C322	F3	R302	F3
C323	C11	R303	F3
C324	K7	R304	G3
C325	K8	R305	H4
C326	K8	R306	H3
C327	K8	R307	K3
C328	K8	R308	H5
C329	K9	R309	H5
C330	I10	R310	I5
C332	I10	R311	I3
C333	I10	R312	I3
C334	K10	R313	I5
C337	I10	R316	D8
C338	H10	R317	J4
C339	I10	R318	K6
C340	H10	R319	L7
C341	H10	R321	H10
C342	G10	R322	G10
C343	G10	R323	F10
C344	F10	R325	K3
C346	G9	R326	H10
C348	D7	R327	K11
C350	D8	R335	J4
C354	I10	R337	B9
C356	G10	R338	H5
C367	B9	R339	B9
C369	I5	R340	G3
C373	D9	R341	H3
C374	I10	R342	E10
C375	E10	R343	E11
C376	E10	R344	E11
C377	E10	R345	D6
C378	E10	R346	D6
C379	D6	R347	D6
C380	D6	R348	D6
C382	C6	R349	C6
C383	D5	R350	C6
C384	D5	R351	G5
C385	E5	R352	D5
C386	E4	R353	E5
C387	F4	R354	E5
C388	F4	R355	E5
C389	D4	R356	E4
C390	E4	R357	F5
C391	E3	R358	E4
C392	D3	R359	C5
C393	D3	R360	C5
C394	C3	R361	C5
C395	K10	R362	C4
C396	B9	R363	E3
C3V1	G5	R364	D3
C7V1	D5	R365	C3
C7V2	N3	R366	G2
C7V3	N3	R3A1	D6
C7V5	O3	R3A2	D7
C7V6	P3	R3B1	D6
C7V7	N5	R3D1	H4
C7V8	M5	R3S2	I3
D301	K3	R7V1	N5
D351	I3	R7V4	P3
FL301	D3	R7V6	P3
IC201	L8	R7V5	P5
IC301	K5	R7V7	O3
IC7V1	M4	R7V8	N3
L301	H3	X201	N7
L302	H4	X301	G10

WAVEFORM & VOLTAGE SHEET

_ IC301 Oscilloscope Waveform


① IC301 Pin 20 PB mode 500mvp-p
② IC301 Pins 38, 32, 31 Video in 1Vp-p
③ IC301 Pin 28 PB/REC mode 4.2Vp-p
④ IC301 Pin 7 REC mode 1.4Vp-p
⑤ IC301 Pin 6 REC mode 2.2Vp-p
⑥ IC301 Pin 29 PB mode 2.1Vp-p
⑦ IC301 Pin 41 PB mode 400mVp-p
⑧ IC301 Pin 67 PB mode 600mVp-p
⑨ IC301 Pin 23 PB/REC mode 5Vp-p
⑩ IC301 Pin 24 PB/REC mode 5Vp-p
⑪ IC301 Pins 71, 72 REC mode 340mVp-p
⑫ IC301 Pins 51, 52, 54 PB mode 300mVp-p
⑬ IC301 Pin 66 PB mode 600mVp-p
⑭ IC301 Pin 11 PB mode 3.2Vp-p
⑮ IC301 Pin 10 PB mode 1.8Vp-p
⑯ IC301 Pin 43 PB mode 400mVp-p

_ IC301 Voltage Sheet

PIN	PB	REC	PIN	PB	REC	PIN	PB	REC	PIN	PB	REC	PIN	PB	REC
1	2.44	2.42	21	2.41	2.52	41	2.93	2.92	61	3.43	3.43	81	0	0
2	2.44	2.42	22	0	0	42	3.16	3.14	62	3.31	3.32	82	0.03	0.54
3	2.46	2.44	23	4.46	4.52	43	3.02	2.05	63	5	5	83	0	0
4	2.45	2.35	24	4.19	4.23	44	0	0	64	5	5	84	0.03	0.03
5	0.09	0.66	25	1.69	1.69	45	2.34	2.33	65	2.03	2.03	85	0.03	0.03
6	2.46	2.34	26	0.05	0.06	46	1.46	1.44	66	2.66	2.67	86	0	0
7	2.46	2.34	27	0.34	0.34	47	9.13	9.12	67	3.67	3.66	87	4.87	4.80
8	0	0	28	0.34	0.34	48	1.94	1.96	68	0	0	88	1.83	3.97
9	0	0	29	1.76	1.84	49	0.85	0.85	69	0.60	1.27	89	0	0
10	0.93	0.93	30	1.10	4.57	50	0	0	70	1.96	2.92	90	1.83	3.95
11	1.66	1.66	31	2.97	2.94	51	1.83	1.82	71	2.52	2.51	91	1.83	3.96
12	4.96	2.60	32	-	2.3	52	2.71	2.62	72	3.37	1.73	92	0.02	1.55
13	1.49	1.52	33	1.45	1.37	53	0	0	73	3.8	3.17	93	2.17	0.01
14	1.68	1.38	34	1.61	1.79	54	2.62	2.62	74	1.55	0.01	94	0	2.01
15	2.34	2.32	35	3.25	3.22	55	4.91	4.91	75	4.96	4.94	95	0	0
16	5.01	5.02	36	1.82	1.95	56	0.56	0.57	76	2.43	2.41	96	2.29	2.38
17	3.06	0.15	37	4.79	4.79	57	3.44	3.44	77	0.01	0.14	97	0	0
18	1.96	2.45	38	1.61	2.25	58	5.00	5.00	78	2.42	2.42	98	2.43	2.41
19	1.18	2.45	39	4.10	4.10	59	3.36	3.37	79	2.46	2.45	99	5.08	4.26
20	3.01	3.05	40	5.00	5.00	60	3.31	3.31	80	2.43	2.23	100	2.43	2.60

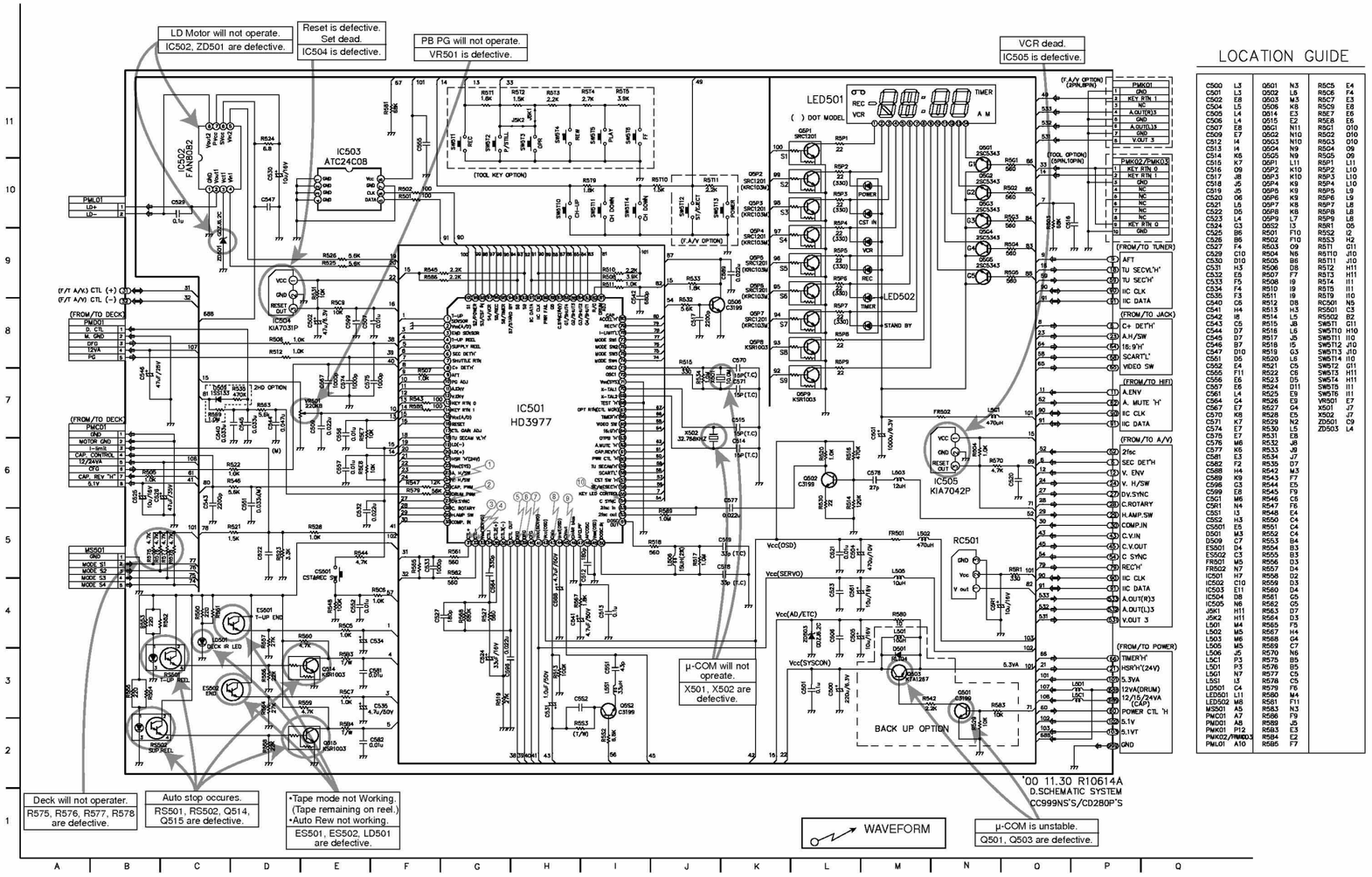
_ IC201 Voltage Sheet

	E	C	B		E	C	B
1	2.239	2.236	2.216	13	3.574	3.565	3.567
2	4.794	4.623	4.731	14	4.442	4.436	4.396
3	3.099	3.096	3.066	15	1.946	1.923	0.099
4	4.264	4.260	4.216	16	3.199	3.2	3.176
5	5.196	5.192	5.137	17	5.150	5.136	5.129
6	4.315	4.163	4.231	18	2.796	2.657	2.701
7	4.652	4.554	4.467	19	2.215	2.936	2.203
8	0.001	0.001	0.001	20	0.002	0.002	0.002
9	0.360	0.356	0.359	21	2.615	2.613	2.603
10	0.048	0.050	0.059	22	2.780	2.802	2.701
11	3.262	3.261	3.236	23	3.387	3.324	3.356
12	1.794	1.813	1.803	24	2.549	2.554	2.536

_ TR Voltage Sheet

	PB mode			REC mode		
	E	C	B	E	C	B
Q301	1.213	3.930	1.664	1.783	3.348	2.435
Q302	1.546	5.156	2.191	1.613	5.147	2.462
Q303	2.161	0	1.499	2.147	0	1.494
Q304	1.217	5.061	1.835	1.216	5.039	1.824
Q305	2.383	0	1.705	2.420	0	1.749
Q306	1.222	0	0.545	1.221	0	0.557
Q307	5.256	0.260	5.176	5.186	3.301	4.352
Q308	0	0	0.744	15.624	0	21.49
Q309	0	0	0.720	-5.69	0	21.77
Q310	5.256	5.160	4.563	5.189	21.04	5.148
Q311	1.224	3.923	1.672	0.271	3.190	0.668
Q3A1	0	5.251	0	1.256	5.179	1.756
Q201	1.313	5.135	1.924	0.625	5.116	0.092
Q202	1.314	5.135	1.237	0.624	5.120	1.219
Q203	0	1.924	0.016	0	0.092	5.111

3. System Circuit Diagram



LOCATION GUIDE

C500	L3	Q501	N3	R5C5	E4
C501	L3	Q502	L5	R5C6	F4
C502	E8	Q503	M5	R5C7	E3
C504	L5	Q506	K6	R5C9	E8
C505	L4	Q514	E3	R5E7	E6
C506	L4	Q515	E2	R5E8	E6
C507	E8	Q5G1	N11	R5G1	D10
C509	E7	Q5G2	N10	R5G2	D10
C512	I4	Q5G3	N10	R5G3	D10
C513	I4	Q5G4	N9	R5G4	D9
C514	K6	Q5G5	N9	R5G5	D9
C515	K7	Q5P1	L11	R5P1	L11
C516	Q9	Q5P2	K10	R5P2	L10
C517	J8	Q5P3	K10	R5P3	L10
C518	J5	Q5P4	K9	R5P4	L10
C519	J5	Q5P6	K9	R5P5	L9
C520	Q6	Q5P6	K9	R5P6	L9
C521	L5	Q5P7	K8	R5P7	L8
C522	D5	Q5P8	K8	R5P8	L8
C523	L4	Q5P9	L7	R5P9	L8
C524	C3	Q5S2	L3	R5R1	D5
C525	B6	R501	F10	R5S2	G2
C526	B6	R502	F10	R5S3	H2
C527	E6	R503	Q9	R5T1	G11
C529	C10	R504	N6	R5T10	J10
C530	H3	R505	D8	R5T11	J10
C531	H3	R506	D8	R5T2	H11
C532	E5	R507	F7	R5T3	I11
C533	F5	R508	I9	R5T4	I11
C534	F4	R510	I9	R5T5	I11
C535	F3	R511	D8	R5T9	I10
C540	G5	R512	D8	RC501	N5
C541	H4	R513	L3	RS501	C3
C542	I8	R514	L5	RS502	B2
C543	C5	R515	J8	SW5T1	G11
C544	D7	R516	L6	SW5T10	H10
C545	D7	R517	J5	SW5T11	I10
C546	D7	R518	I5	SW5T12	J10
C547	D10	R519	G3	SW5T13	J10
C548	E4	R520	L6	SW5T14	H10
C552	E4	R521	C5	SW5T2	G11
C555	F11	R522	C6	SW5T3	H11
C556	E6	R523	D5	SW5T4	H11
C557	E6	R524	D11	SW5T5	I11
C561	G4	R525	E9	SW5T6	I11
C564	G4	R526	E9	VR501	E7
C567	E7	R527	G4	X501	J7
C570	K8	R528	E5	X502	J7
C571	E7	R529	N2	ZD501	C9
C574	E7	R530	L5	ZD503	L4
C576	E7	R531	E8		
C577	K6	R532	J8		
C578	E3	R533	J9		
C582	F2	R534	J7		
C583	F4	R535	D7		
C589	K9	R542	N3		
C596	G3	R543	F7		
C5G1	M6	R544	E5		
C5G2	M6	R545	F9		
C5S1	I3	R546	C6		
C5S2	I3	R547	F6		
CS501	E5	R548	E4		
D501	M3	R550	C4		
ES501	D4	R551	C4		
ES502	C3	R552	C4		
FR501	M5	R553	B4		
FR502	N7	R554	B3		
IC501	H7	R555	B3		
IC502	C10	R556	D3		
IC503	E11	R557	D4		
IC504	D8	R558	D2		
IC505	N6	R559	D3		
J5K1	H11	R560	D4		
J5K2	H11	R561	G5		
L501	M4	R562	G5		
L502	M5	R563	D7		
L503	M6	R564	D3		
L505	M5	R565	F3		
L506	J5	R567	H4		
L5C1	P3	R568	G4		
L5D1	P3	R569	C7		
L5G1	N7	R570	N6		
L5S1	I3	R575	B9		
LD501	C4	R576	B5		
LED501	L11	R577	C5		
LED502	M8	R578	C5		
MS501	A5	R579	F8		
PWC01	A7	R580	M4		
PWD01	A8	R581	F11		
PWK01	P12	R583	N3		
PWK02/PWK03		R584	E2		
PWL01	A10	R585	F7		

* IC501 Waveform Photographs

① IC501 Pin 24
1V/5mS
REC/PB modes
(V.H/SW)

② IC501 Pin 27
1V/2mS
QUE/REV modes
(D.V-SYNC)

③ IC501 Pin 31
1V/10mS
REC mode
(CTL+)

④ IC501 Pin 32
1V/10mS
REC mode
(CTL-)

⑤ IC501 Pin 38
1V/1mS
REC/PB mode
(DFG)

⑥ IC501 Pin 39
1V/10uS
REC/PB modes
(DPG)

⑦ IC501 Pin 40
1V/1mS
REC/PB modes
(CFG)

⑧ IC501 Pin 43
100mV/10uS
EE/PB modes
(V-IN)

⑨ IC501 Pin 45
500MV/10uS
EE/PB modes
(V-OUT)

⑩ IC501 Pin 54
1V/20uS
EE/PB modes
(C-SYNC)

_ System IC Voltage Sheet

	Emitter		Collector		Base	
	PB	REC	PB	REC	PB	REC
Q514	0	0	H/L	H/L	H/L	H/L
Q515	0	0	H/L	H/L	H/L	H/L
Q506	0	0	0.7	0.7	0.4	0.4
Q503	5.32	5.32	5.25	5.24	4.43	4.43
Q501	0	0	0	0	0.75	0.75

_ IC503 Voltage Sheet

	5			
PB	5.34	0.00	4.80	4.80
REC	5.34	0.00	5.21	5.21

IC503

	1			
PB	0.00	0.00	0.00	0.00
REC	0.00	0.00	0.00	0.00

_ SYSTEM IC Voltage Sheet

• IC501(HD3977)

	PB	REC		PB	REC		PB	REC		PB	REC		PB	REC
1	0	0	21	5.24	5.24	41	5.24	5.24	61	0	0	81	2.55	2.55
2	0	0	22	5.24	5.24	42	4.99	4.99	62	0	0	82	5.07	5.07
3	0.76	0.79	23	H/L	H/L	43	2.41	2.37	63	0	0	83	0	0
4	H/L	H/L	24	H/L	H/L	44	1.36	1.36	64	5.21	5.21	84	0	0
5	H/L	H/L	25	2.81	2.81	45	2.43	2.43	65	5.21	5.21	85	0	0
6	3.34	3.3	26	2.73	2.73	46	0	0	66	0	0	86	0	0
7	1	2	27	0	0	47	2.01	2.01	67	4.58	4.58	87	4.7	4.7
8	1	2	28	H/L	H/L	48	1.41	1.41	68	0	0	88	0	0
9	3.2	1.62	29	5.15	5.15	49	0	0	69	1.45	1.45	89	4.67	4.67
10	2.2	2.2	30	4.97	4.88	50	1.32	1.32	70	0.83	0.83	90	5.08	5.08
11	0.74	0	31	2.25	2.99	51	1.35	1.35	71	0	0	91	5.03	5.03
12	4.0	2.3	32	2.25	2.2	52	2.5	2.5	72	2.49	2.47	92	5.28	5.28
13	5.26	5.26	33	0	0	53	2.43	2.43	73	2.47	2.47	93	5.28	5.28
14	5.26	5.26	34	0	0	54	0.38	0.38	74	5.29	5.29	94	4.6	4.6
15	5.26	5.26	35	2.25	2.25	55	5.21	5.21	75	0	0	95	5.2	5.2
16	5.24	5.26	36	2.25	2.25	56	0	0	76	5.29	5.29	96	0	0
17	0	0	37	2.25	2.25	57	5.05	5.05	77	2.29	5.29	97	0	0
18	0	0	38	Pulse	Pulse	58	5.16	5.20	78	3.14	3.15	98	0	0
19	5.18	5.18	39	Pulse	Pulse	59	0	0	79	0	4.84	99	0	0
20	5.16	5.18	40	Pulse	Pulse	60	5.21	5.14	80	2.8	2.8	100	0	0

4. Hi-Fi, SCART Circuit Diagram

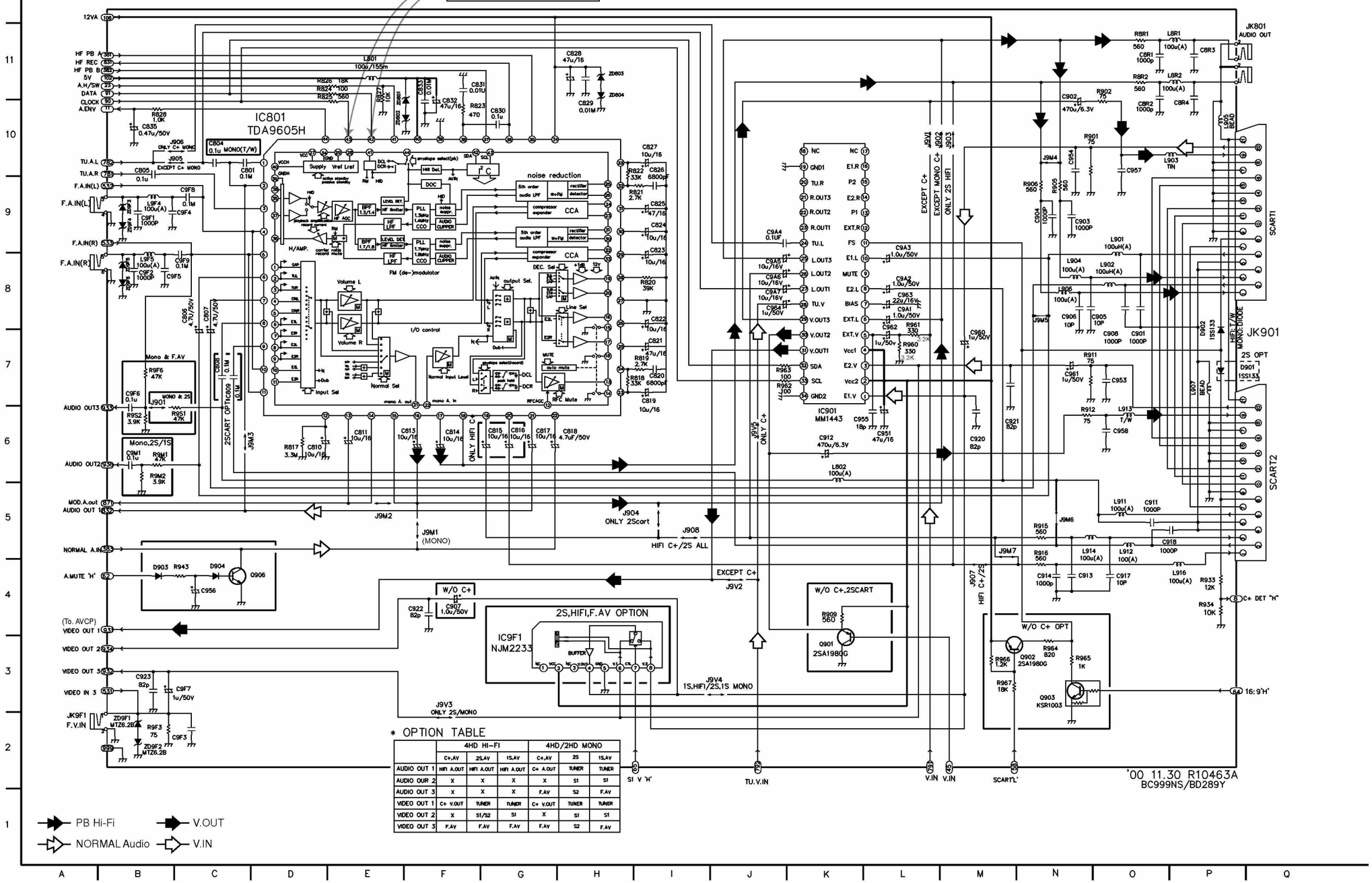
*** IC901 Voltage Sheet**

PB	0	4.6	4.7	3.8	1.5	1.5	3.3	5.5	5.5	5.5	5.5	5.5	5.5	5.5		0
REC	0	4.8	4.7	3.8	1.5	1.5	3.3	5.5	5.5	5.5	5.5	5.5	5.5	5.5		0
				30					25					20		
IC901(MM1443)																
				5					10					15		
PB	2.7	11.6	2.7	11.6	3.5	5.5	5.5	5.5	0	5.5	11.7	5.5	0	5.5	0	5.5	0
REC	2.7	11.6	2.7	11.6	3.5	5.5	5.5	5.5	0	5.5	11.7	5.5	0	5.5	0	5.5	0

*** IC801 Voltage Sheet**

PB	3.6	4.4	4.2	0.9	5.1	0.0	0.0	0.7	0.6	0.7	11.9	3.9	3.9	3.9	0.8	3.9	3.9	0.0	0.8	3.9	3.9	3.9
REC	1.9	4.4	4.1	0.9	5.0	0.0	4.2	4.3	4.2	4.3	12.0	3.9	3.9	3.9	0.8	3.9	3.9	0.0	0.8	3.9	3.9	3.9
				40					35					30					25			
IC801(TDA9605H)																						
				5					10					15					20			
PB	3.8	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.8	0.0	3.9	0.0	0.0	6.0	6.0	0.0	6.0	6.0	4.5	3.8	
REC	3.8	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	3.9	3.9	0.0	3.8	0.0	0.0	6.0	6.0	0.0	6.0	6.1	4.6	3.8

IC801 42, 43 Pins are defective.
All Audio is not appear.

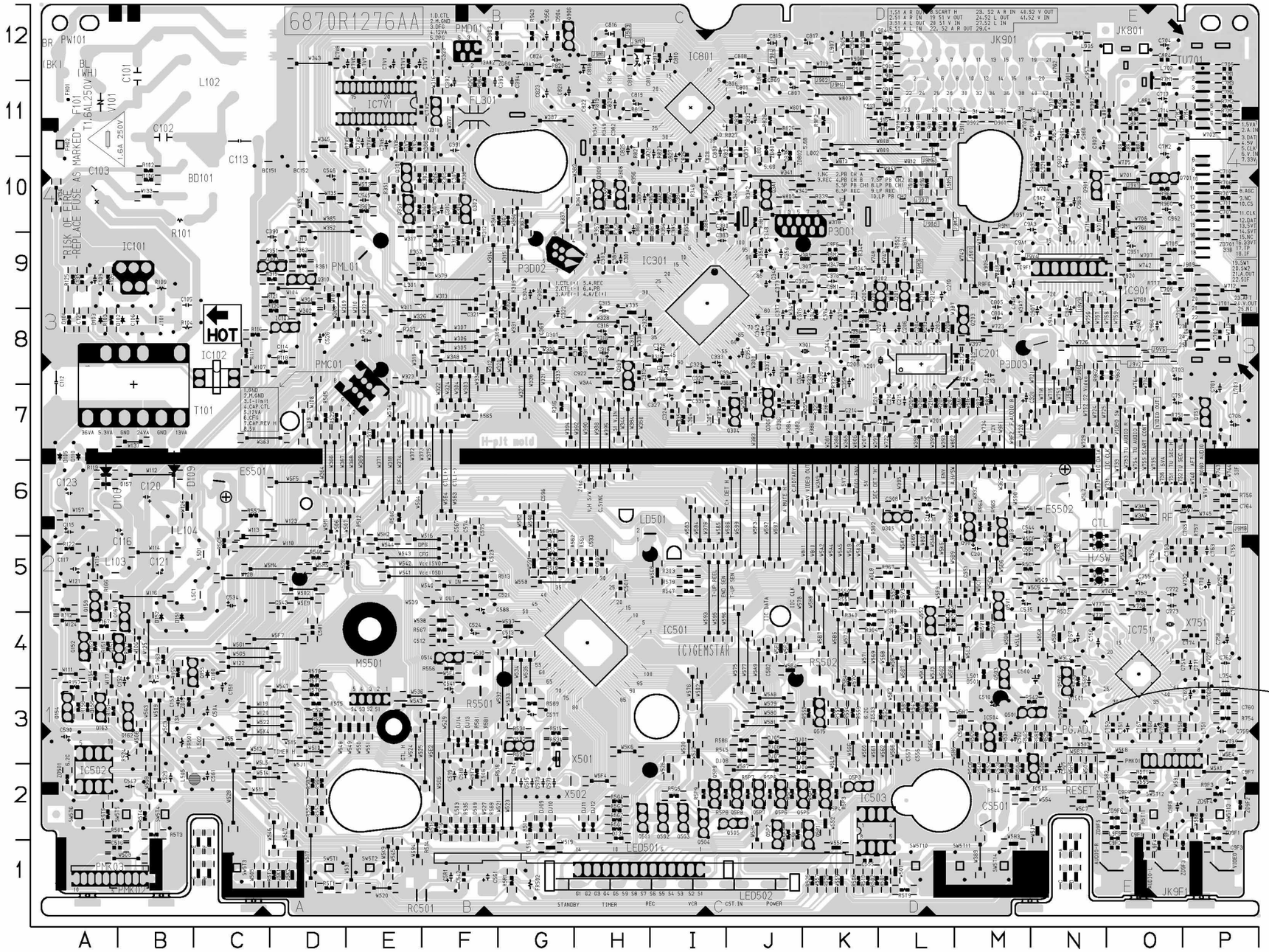


* OPTION TABLE

	4HD HI-FI			4HD/2HD MONO		
	C+,AV	2S,AV	1S,AV	C+,AV	2S	1S,AV
AUDIO OUT 1	HIFI A.OUT	HIFI A.OUT	HIFI A.OUT	C+ A.OUT	TUNER	TUNER
AUDIO OUR 2	X	X	X	X	S1	S1
AUDIO OUT 3	X	X	X	F.AV	S2	F.AV
VIDEO OUT 1	C+ V.OUT	TUNER	TUNER	C+ V.OUT	TUNER	TUNER
VIDEO OUT 2	X	S1/S2	S1	X	S1	S1
VIDEO OUT 3	F.AV	F.AV	F.AV	F.AV	S2	F.AV

PRINTED CIRCUIT BOARD DIAGRAMS

1. MAIN P.C.Board



LOCATION GUIDE

ANG	E8	C346	J9	C574	F5	C822	H11	D902	H11	L561	G1	G5P4	K2	R341	E10	R559	K3	R7Y8	E11
BC151	C10	C348	J9	C575	F5	C823	G11	D903	G10	L651	L5	G5P5	K2	R342	K8	R560	D2	R817	I12
BC152	D10	C350	J9	C576	F2	C824	G12	D904	G12	L702	G12	G5P6	J2	R343	K9	R561	H5	R818	H11
BD101	C10	C354	J8	C577	G3	C825	H11	D101	J3	L703	F7	G5P7	J2	R344	K9	R562	G5	R819	H11
C101	B12	C358	K8	C581	D4	C826	I11	D102	J3	L704	F8	G5P8	J2	R345	J10	R563	E10	R820	G12
C102	B11	C367	K10	C582	J4	C827	I10	D103	J3	L705	G9	G5P9	I2	R346	I10	R564	H5	R821	H11
C103	A10	C369	G8	C588	F5	C828	I10	D106	J2	L751	F3	G532	L4	R347	H11	R565	F7	R822	J11
C105	B9	C373	J9	C589	H4	C829	I10	D105	J3	L752	G5	G5V1	H5	R348	I10	R567	F4	R823	J11
C106	B8	C374	K8	C596	G5	C830	I11	D106	J3	L754	F4	G7B1	G10	R349	H11	R568	G5	R824	H7
C109	A9	C375	K8	C599	H3	C831	J11	D107	J3	L755	F6	G7S1	F7	R350	J9	R569	F2	R825	H7
C112	A8	C376	K8	C501	F1	C832	J11	D108	G2	L7Y1	E12	G901	H10	R351	D9	R570	H5	R826	J11
C113	C11	C377	J8	C581	F1	C833	J11	D109	G2	L801	J11	G902	H6	R352	I10	R575	D3	R827	J11
C114	D8	C378	K9	C551	H6	C835	J11	D110	H2	L802	K11	G903	H5	R353	I10	R576	D3	R828	J11
C115	A5	C379	I10	C552	L4	C891	I11	D111	H2	L901	G11	G906	G12	R354	I10	R577	D4	R901	G11
C116	B6	C380	I10	C701	P7	C892	G11	D112	H2	L902	G11	R101	B10	R355	I10	R578	D4	R902	G11
C117	A5	C382	K11	C702	P8	C893	D12	D113	H2	L903	N12	R102	B10	R356	H10	R579	I5	R903	H11
C120	B6	C383	I9	C703	Q8	C894	C12	D114	F3	L904	L12	R103	A8	R357	H10	R580	K3	R902	H11
C121	B5	C384	I10	C704	Q12	C901	L11	D121	H2	L905	N12	R104	B8	R358	H10	R581	F3	R905	K12
C122	A5	C385	I10	C705	P12	C902	N11	E5501	K7	L906	L12	R105	B10	R359	H10	R583	H5	R906	K12
C127	A8	C386	H10	C706	P7	C903	K12	E5502	M7	L907	K12	R109	B9	R360	H10	R586	J3	R909	H10
C135	A9	C387	H10	C707	P10	C904	K12	FH01	A11	L906	L12	R112	A5	R361	D9	R589	G3	R911	H11
C151	C4	C388	H10	C710	P10	C905	K12	FH02	A11	L907	K12	R114	B4	R362	D9	R581	F3	R912	H11
C152	B4	C389	H10	C711	P10	C906	L12	FL301	F11	L911	L11	R116	C8	R363	G10	R583	D2	R915	L10
C153	B3	C390	D9	C712	P9	C907	N8	FR501	B3	L912	L11	R117	C8	R364	F11	R584	K4	R916	L10
C201	K5	C391	F11	C713	O11	C908	L12	FR502	G1	L913	N11	R118	D8	R365	F11	R585	L3	R933	N10
C202	L9	C392	F11	C714	O11	C911	L11	IC101	B9	L914	L11	R119	A6	R366	F11	R5C5	C5	R934	N10
C203	L8	C393	F11	C751	G3	C912	N10	IC102	C8	L915	L11	R120	D8	R341	G10	R5C6	H2	R9C3	G12
C204	L8	C394	F11	C752	O1	C913	L11	IC103	C8	L916	L11	R121	D9	R342	G10	R5C7	H2	R9C4	H5
C205	K8	C395	I7	C753	O5	C914	L11	IC502	A2	L9F5	G2	R122	A5	R381	J10	R5C9	H5	R961	O10
C206	K8	C396	L4	C754	O6	C915	L11	IC503	A2	L9U1	H5	R123	A5	R382	J10	R5E7	H5	R962	N8
C207	L8	C581	H9	C755	Q5	C916	L11	IC584	H5	LED501	I1	R124	A9	R352	E9	R5E8	L3	R963	O8
C208	K8	C580	N4	C756	N4	C920	O9	IC585	K2	LED502	J1	R125	A6	R501	L1	R5G1	H2	R964	M5
C209	L9	C581	N5	C757	N4	C921	N10	IC701	H9	P3D01	J10	R126	A9	R502	L1	R5G2	H2	R965	M5
C212	H8	C582	H3	C758	P4	C922	H8	IC9F1	H9	P3D02	G9	R151	A4	R503	A2	R5G3	H2	R966	M5
C213	H8	C584	G3	C759	P3	C923	H8	J101	B8	P3D03	H9	R152	B4	R504	K2	R5G4	H2	R967	L5
C214	K7	C585	H3	C760	P3	C924	H8	J102	B8	P4C01	E7	R153	A4	R505	I1	R5G5	H2	R968	L5
C215	L7	C586	H2	C761	P5	C953	N11	J5K2	D1	P4C02	E7	R157	A4	R506	E6	R5P1	J2	R9F2	K11
C216	L7	C587	H5	C762	P4	C954	N11	J701	P8	P4D01	F12	R158	A3	R507	F6	R5P2	J2	R9F3	P2
C217	L7	C589	H5	C763	O3	C955	N11	J702	P8	P4K01	O3	R159	B4	R508	F6	R5P3	J2	R9F4	P2
C301	H9	C510	K3	C764	P6	C957	N12	J902	K12	P4K02	B1	R161	A3	R510	K1	R5P4	K2	R9F5	K9
C302	J9	C512	C4	C765	P3	C958	N11	J903	N12	P4K03	B1	R163	B4	R511	G2	R5P5	J2	R9F6	K9
C303	H9	C513	G4	C766	O3	C959	N11	J904	J12	P4L01	E9	R166	B4	R512	G2	R5P6	J2	R9G1	N10
C304	G9	C514	G2	C767	O3	C961	N11	J905	M7	P4Y01	A12	R167	A4	R513	F5	R5P7	J2	R9G2	L9
C305	G9	C515	G2	C768	P3	C962	O10	J906	M7	Q151	B4	R203	H6	R514	F7	R5P8	J2	R9G3	E1
C306	F8	C516	A1	C769	P3	C963	N10	J907	L10	Q152	A4	R204	H7	R515	G3	R5P9	I2	R9G4	E1
C307	F10	C517	N5	C770	P5	C964	O8	J908	L10	Q154	A3	R205	L7	R516	F2	R5R1	G1	R5S01	F4
C308	L6	C518	F2	C771	P5	C965	N9	J909	P9	Q155	B4	R206	L7	R517	F2	R5S2	L5	R5S02	K4
C309	G8	C519	F2	C772	Q5	C9A2	N10	J9H1	H12	Q159	A5	R207	L7	R518	F3	R5S3	L4	R5T01	D1
C310	F10	C520	K2	C773	Q5	C9A3	N10	J9K2	H12	Q161	B4	R209	L7	R519	G5	R5T1	D1	R5T02	O2
C311	F9	C521	C4	C774	P12	C9A4	N9	J9K3	K11	Q162	B3	R210	L7	R520	G3	R5T10	O2	R5T12	O2
C312	F10	C522	D3	C7H1	P12	C9A5	N8	J9K4	K11	Q163	A3	R211	L9	R521	D3	R5T11	O2	R5T13	P2
C313	H8	C523	F5	C7H2	O11	C9A6	N9	J9M5	L10	Q201	L9	R212	L9	R522	D7	R5T2	D1	R5T14	M8
C314	H8	C524	F4	C7H3	O11	C9A7	N8	J9M6	L10	Q202	L9	R213	L8	R523	G3	R5T3	E1	R5T2	E1
C315	H8	C525	E8	C7H4	P11	C9F1	O1	J9M7	L10	Q203	H6	R262	K5	R524	B3	R5T4	B2	R5T3	C1
C316	H8	C526	D8	C7H5	P11	C9F2	O1	J9M8	P6	Q301	E10	R303	I5	R525	K1	R5T5	A2	R5T4	B2
C317	H8	C527	H8	C7H6	P11	C9F3	O2	J9N1	P6	Q302	F10	R304	K4	R526	K3	R5T6	A2	R5T5	B2
C318	H8	C529	D2	C7Y1	E12	C9F4	O2	J9Y2	G8	Q303	H6	R305	F10	R527	G5	R5V1	H4	R5T6	A2
C319	H8	C530	D2	C7Y2	E11	C9F5	N2	J9Y3	H5	Q304	J7	R306	F10	R528	G5	R5V2	H4	T101	F12
C320	M7	C531	L6	C7Y3	E11	C9F6	K9	J9Y4	H5	Q305	L6	R307	F10	R529	K3	R5Y3	L5	TU701	P12
C321	F8	C532	L3	C7Y5	E11	C9F7	P2	J9Y5	G8	Q306	J7	R308	G9	R530	G3	R7Y05	D9	V101	A11
C322	G8	C533	K5	C7Y6	E11	C9F8	P2	J9Y6	G8	Q307	D9	R309	G9	R531	K3	R7Y06	D9	W5501	K3
C323	F12	C534	C5	C7Y7	E12	C9F9	O2	JK901	H12	Q308	H10	R310	F10	R532	N5	R707	P10	X201	L8
C324	I7	C535	H5	C7Y8	E12	C9H1	K9	JK9F1	P1	Q309	H10	R311	F9	R533	N4	R753	O5	X301	K8
C325	I8	C540	E11	C801	I12	C9H2	K9	L102	B5	Q310	H10	R312	F9	R534	C4	R754	O5	X501	G3
C326	I8	C541	F3	C804	H9	D102	B8	L103	A5	Q311	F11	R313	F9	R535	F2	R755	P5	X502	G2
C327	I7	C542	F1	C805	H9	D103	A8	L104	B6	Q331	J10	R315	D9	R542	N3	R756	P6	X751	O4
C328	I8	C543	D6	C806	J12	D104	A8	L105	B6	Q332	J10	R316	D9	R543	N3	R757	P5	ZD501	P1
C329	I8	C544	K6	C807	J11	D105	A7	L302	E10	Q501	K3	R317	H8	R544	N2	R758	P3	ZD501	A2
C330	I7	C545	E10	C808	J12	D106	A6	L303	F9	Q502	G3	R318	H8	R545	L3	R759	G3	ZD503	L3
C332	J7	C546	D10	C809	J12	D107	A6	L304	I7	Q503	H4	R319	H8	R546	D5	R760	G3	ZD701	P3
C333	I8	C547	B2	C810	J12	D110	A7	L305	I7	Q506	H4	R321	K8	R547	I5	R7M1	O11	ZD801	J11
C334	I8	C551	H5	C811	H12	D151	B4	L307	K8	Q514	F4	R322	K8	R548	M2	R7M2	P11	ZD802	J11
C336	J7	C552	H2	C813	H12	D152	B4	L308	K9	Q515	K3	R323	K7	R550	K5	R7M3	O11	ZD803	F12
C337	J8	C555	K1	C814	H12	D156	A3	L310	D8	Q551	H2	R325	L6	R551	K5	R7M4	P11	ZD804	G12
C338	J7	C556	L3	C815	J12	D157	A6	L501	M4	Q562	J2	R326	J7	R552	D2	R7M5	P11	ZD5F1	P2
C339	K8	C557	L3	C816	H12	D160	C4	L502	C3	Q563	J2	R327	E8	R553	D2	R751	O7	ZD5F2	P2
C340	K8	C561	G12	C817	K12	D301	G8	L503	F2	Q564	J2	R335	I7	R554	K3	R7Y1	E12	ZD5F3	P1
C341	J8	C564	D5	C818	H12	D351	E9	L505	K2	Q565	J2	R337	L4	R555	K3	R7Y4	E11	ZD5F4	P2
C342	J8	C567	F5	C819	H11	D501	M4	L506	F2	Q5P1	K3	R338	F10	R556	F4	R7Y5	E11	ZD5F5	O2
C343	J8	C570	G2	C820	H11	D509	F2	L5C1	C5	Q5P2	J2	R339	K10	R557	G5	R7Y6	E12	ZD5F6	O2
C344	K9	C571	G2	C821	G11	D901	H11	L5D1	C5	Q5P3	K2	R340	K4	R558	K3	R7Y7	E11		

PG.ADJ

ABBREVIATIONS

ADJ : Adjustment
PG : Pulse Generator

NOTE : ● Measurement Point
□ : Adjustment Point
Emitter : TRANSISTOR
Collector
Base

(Solder Side)

SECTION 4 MECHANISM

CONTENTS

DECK MECHANISM PARTS LOCATIONS

- **Top View.....4-1**
- **Bottom View 4-1**

DECK MECHANISM DISASSEMBLY

1. Drum Assembly 4-3
2. Plate Assembly Top.....4-4
3. Holder Assembly CST 4-4
4. Guide CST 4-4
5. Bracket Side(L)/Bracket Assembly Door 4-4
6. Arm Assembly F/L 4-4
7. Lever Assembly S/W 4-4
8. Arm Assembly Cleaner.....4-6
9. Head F/E 4-6
10. Base Assembly A/C Head 4-6
11. Brake Assembly S 4-7
12. Brake Assembly T 4-7
13. Arm Assembly Tension 4-7
14. Reel S/Reel T 4-7
15. Support CST 4-8
16. Base Assembly P4 4-8
17. Opener Lid 4-8
18. Arm Assembly T/up 4-8
19. Arm Assembly Pinch 4-8
20. Belt Capstan/Motor Capstan 4-9
21. Clutch Assembly D33-K 4-9
22. Lever F/R 4-9
23. Gear H-up/D-K 4-9
24. Bracket Assembly Jog.....4-10
25. Guide Rack F/L, Gear Rack F/L 4-10
26. Brake Assembly Capstan 4-10
27. Gear Drive/Gear Cam/Gear Connector 4-11
28. Bracket Assembly L/D Motor 4-11
29. Gear Sector 4-12
30. Base Tension/Plate Slider/Lever Tension 4-12
31. Gear Assembly P3/Gear Assembly P2 4-13
32. Base Assembly P3/Base Assembly P2 4-13
33. Arm Assembly Idler Jog 4-13

DECK MECHANISM ADJUSTMENT

- **Tools and Fixtures for Service.....4-14**
1. Mechanism and Mode Switch Alignment Check 4-15
2. Deck Preparation for Adjustment 4-17
3. Checking Torque 4-17
4. Guide Roller Height Adjustment.....4-18
   4-1. Preliminary Adjustment 4-18
   4-2. Precise Adjustment 4-18
5. Audio/Control (A/C) Head Adjustment 4-19
   5-1. Preliminary Adjustment 4-19
   5-2. Confirmation of Tape Path between Pinch Roller and Take-up Guide 4-20
   5-3. Precise Adjustment(Azimuth Adjustment) 4-20
6. X-Value Adjustment.....4-20
7. Adjustment after Replacing Drum Assembly (Video Heads) 4-21
8. Check the Tape Travel after Reassembling Deck Mechanism.....4-21
   8-1. Checking Audio and RF Locking Time during Playback after CUE or REV 4-21
   8-2. Checking Tape Curling or Jamming 4-21

MAIN TENANCE/INSPECTION PROCEDURE

1. Check before starting Repairs 4-22
2. Required Maintenance 4-24
3. Scheduled Maintenance.....4-24
4. Supplies Required for Inspection and Maintenance.....4-24
5. Maintenance Procedure 4-24
   5-1. Cleaning.....4-24
   5-2. Greasing 4-25

MECHANISM TROUBLESHOOTING GUIDE

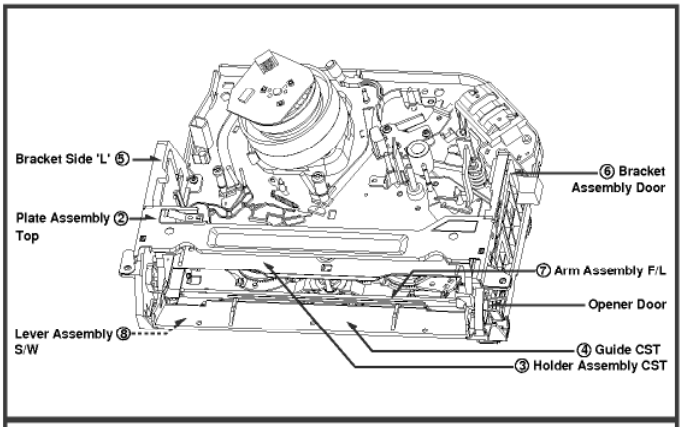
1. Deck Mechanism.....4-26
2. Front Loading Mechanism.....4-29

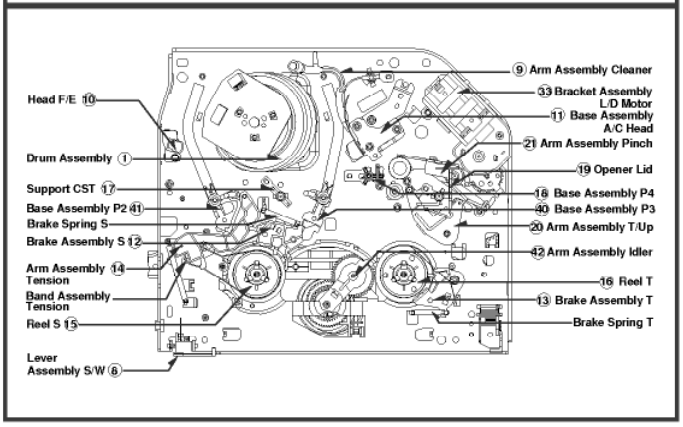
EXPLODED VIEWS

1. Front Loading Mechanism Section 4-31
2. Moving Mechanism Section (1).....4-32
3. Moving Mechanism Section (2).....4-33

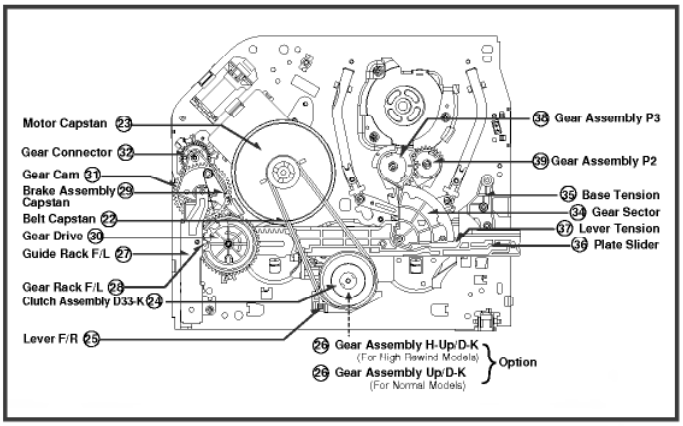
DECK MECHANISM PARTS LOCATIONS(FOR NORMAL MODELS)

• Top View





• Bottom View



NOTE : When reassembly perform the procedure in the reverse order.

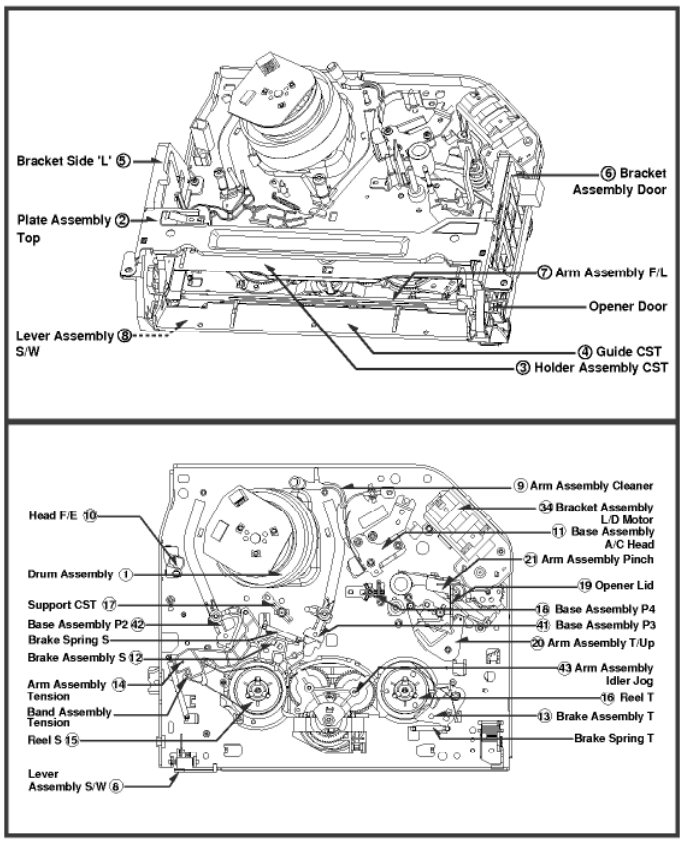
1) When reassembling, confirm Mechanism and Mode Switch Alignment Position (Pefer to Page 4-14)
2) When disassembling, the Parts for Starting No. Should be removed first.

Pracedure / Starting No.		Part	Fixing Type	Figure
	1	Drum Assembly	3 Screws , Cap FPC	A-1
	2	Plate Assembly Top	Two Hooks	A-2
2	3	Holder Assembly CST	Chassis Hole	A-2
	4	Guide CST	2 Hooks	A-2
2,3,4	5	Bracket Side (L)	1 Screw	A-2
2,3,4	6	Bracket Assembly Door	1 Screw	A-2
2,3,4,5,6	7	Arm Assembly F/L	Chassis Hole	A-2
2,3,4,5	8	Lever Assembly S/W	Chassis Hole	A-2
	9	Arm Assembly Cleaner	Chassis Embossing	A-3
	10	Head F/E	2 Hooks	A-3
	11	Base Assembly A/C Head	1 Screw	A-3
	12	Brake Assembly S	Chassis Hole	A-4
2,3	13	Brake Assembly T	Chassis Hole	A-4
2,3,12,	14	Arm Assembly Tension	Chassis Hole	A-4
2,3,12,14	15	Reel S	Chassis Shaft	A-4
2,3,13	16	Reel T	Chassis Shaft	A-4
	17	Support CST	Chassis Embossing	A-5
	18	Base Assembly P4	Chassis Embossing	A-5
	19	Opener Lid	Chassis Embossing	A-5
19	20	Arm Assembly T/Up	Chassis Embossing	A-5
19	21	Arm Assembly Pinch	Chassis Shaft	A-5

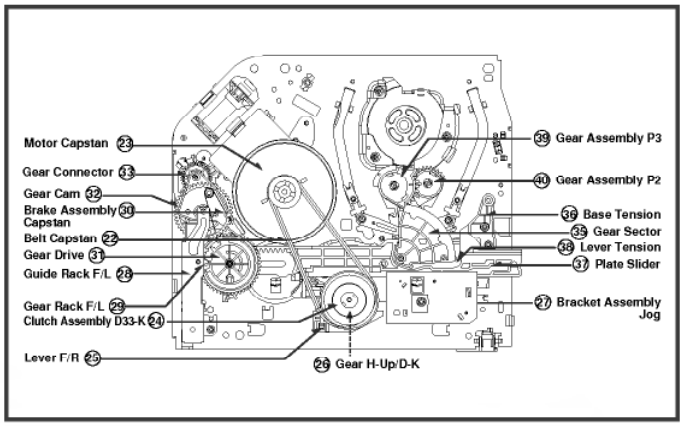
Pracedure / Starting No.		Part	Fixing Type	Figure
	22	Belt Capstan		A-6
22	23	Motor Capstan	3 Screws	A-6
	24	Clutch Assembly D33-K	1 Washer	A-6
22,24	25	Lever F/R	1 Hook	A-6
22,24	26	Gear H-Up/D-K	2 Washers	A-6
	27	Guide Rack F/L	1Screw	A-7
27	28	Gear Rack F/L		A-7
27, 28	29	Brake Assembly Capstan	Chassis Shaft	A-7
27, 28	30	Gear Drive	1 Washer	A-8
27, 28, 29	31	Gear Cam	Chassis Shaft	A-8
27, 28, 29, 30	32	Gear Connector	Chassis Shaft	A-8
	33	Bracket Assembly L/D Motor	3 Hooks	A-8
	34	Gear Sector	3 Washers	A-9
	35	BaseTension	1 Screw	A-9
22, 24, 25, 27, 28, 30, 34, 35	36	Plate Slider	Chassis Shaft	A-9
22, 24, 25, 27, 28, 30, 34, 35	37	Lever Tension	Chassis Hole	A-9
34 A-10	38	Gear Assembly P3	2 Hooks	
34, 38	39	Gear Assembly P2	2 Hooks	A-10
34, 38, 39	40	Base Assembly P3	Chassis Hole	A-10
34, 38, 39, 40	41	Base Assembly P2	Chassis Hole	A-10
1, 2	42	Arm Assembly Idler	1 Hook	A-10

DECK MECHANISM PARTS LOCATIONS(FOR JOG SHUTTLE MODELS)

• Top View



• Bottom View



NOTE : When reassembly perform the procedure in the reverse order.

1) When reassembling, confirm Mechanism and Mode Switch Alignment Position (Pefer to Page 4-14)
2) When disassembling, the Parts for Starting No. Should be removed first.

Pracedure / Starting No.		Part	Fixing Type	Figure
	1	Drum Assembly	3 Screws , Cap FPC	A-1
	2	Plate Assembly Top	Two Hooks	A-2
2	3	Holder Assembly CST	Chassis Hole	A-2
	4	Guide CST	2 Hooks	A-2
2,3,4	5	Bracket Side (L)	1 Screw	A-2
2,3,4	6	Bracket Assembly Door	1 Screw	A-2
2,3,4,5,6	7	Arm Assembly F/L	Chassis Hole	A-2
2,3,4,5	8	Lever Assembly S/W	Chassis Hole	A-2
	9	Arm Assembly Cleaner	Chassis Embossing	A-3
	10	Head F/E	2 Hooks	A-3
	11	Base Assembly A/C Head	1 Screw	A-3
	12	Brake Assembly S	Chassis Hole	A-4
2, 3	13	Brake Assembly T	Chassis Hole	A-4
2 ,3,12,	14	Arm Assembly Tension	Chassis Hole	A-4
2, 3,12,14	15	Reel S	Chassis Shaft	A-4
2, 3,13	16	Reel T	Chassis Shaft	A-4
	17	Support CST	Chassis Embossing	A-5
	18	Base Assembly P4	Chassis Embossing	A-5
	19	Opener Lid	Chassis Embossing	A-5
19	20	Arm Assembly T/Up	Chassis Embossing	A-5
19	21	Arm Assembly Pinch	Chassis Shaft	A-5

Pracedure / Starting No.		Part	Fixing Type	Figure
	22	Belt Capstan		A-6
22	23	Motor Capstan	3 Screws	A-6
	24	Clutch Assembly D33-K	1 Washer	A-6
22,24	25	Lever F/R	1 Hook	A-6
22,24	26	Gear H-Up/D-K	2 Washers	A-6
	27	Bracket Assembly Jog	1 Screw	A-7
	28	Guide Rack F/L	1Screw	A-7
28	29	Gear Rack F/L		A-7
28, 29	30	Brake Assembly Capstan	Chassis Shaft	A-7
28, 29	31	Gear Drive	1 Washer	A-8
28, 29, 30	32	Gear Cam	Chassis Shaft	A-8
28, 29, 30, 31	33	Gear Connector	Chassis Shaft	A-8
	34	Bracket Assembly L/D Motor	3 Hooks	A-8
	35	Gear Sector	3 Washers	A-9
	36	BaseTension	1 Screw	A-9
22, 24, 25, 27, 28, 29, 31, 35, 36	37	Plate Slider	Chassis Shaft	A-9
22, 24, 25, 27, 28, 29, 31, 35, 36	38	Lever Tension	Chassis Hole	A-9
35	39	Gear Assembly P3	2 Hooks	A-10
35, 39	40	Gear Assembly P2	2 Hooks	A-10
35, 39, 40	41	Base Assembly P3	Chassis Hole	A-10
35, 39, 40, 41	42	Base Assembly P2	Chassis Hole	A-10
1, 2	43	Arm Assembly Idler Jog	1 Hook	A-10

DECK MECHANISM DISASSEMBLY

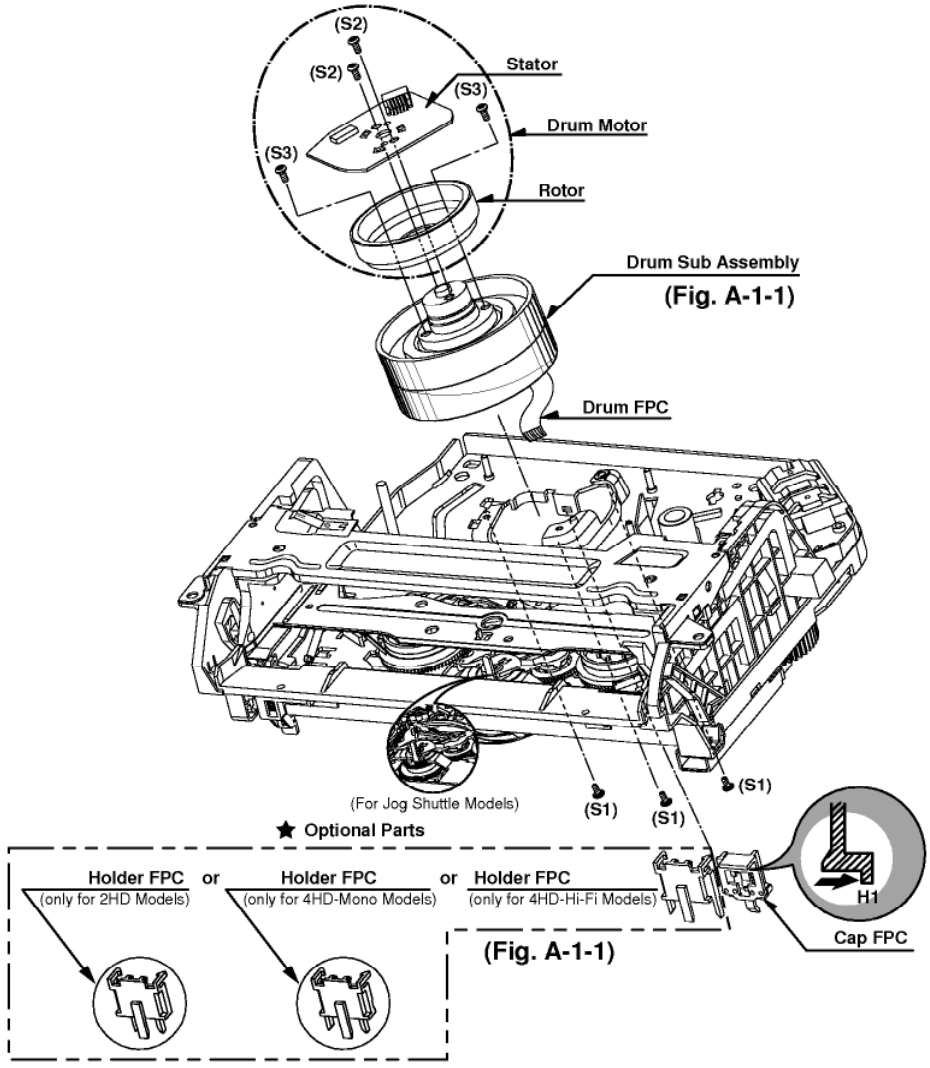


Fig. A-1

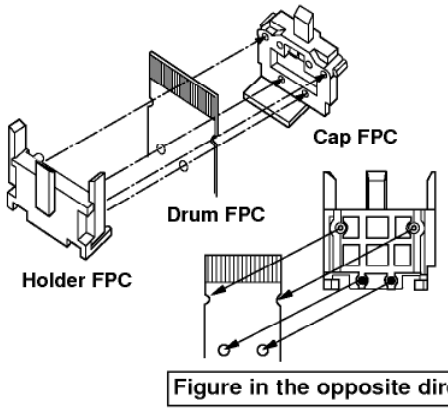
1. Drum Assembly (Fig. A-1-1)

1) Unhook the (H1) on the back side of the Chassis and separate the Cap FPC.
2) Remove three Screws (S1) and lift up the Drum Assembly.
3) Remove two Screws (S2) and Separate the Stator of Drum Motor.
4) Remove two Screws (S3) and Separate the Rotor of Drum Motor from the Drum Sub Assembly.

NOTE

(1) When reassembling Cap FPC, two Holes of Drum FPC are inserted to the two Bosses of Holder FPC correctly. (Refer to Fig. B-1)

(Fig. B-1)



DECK MECHANISM DISASSEMBLY

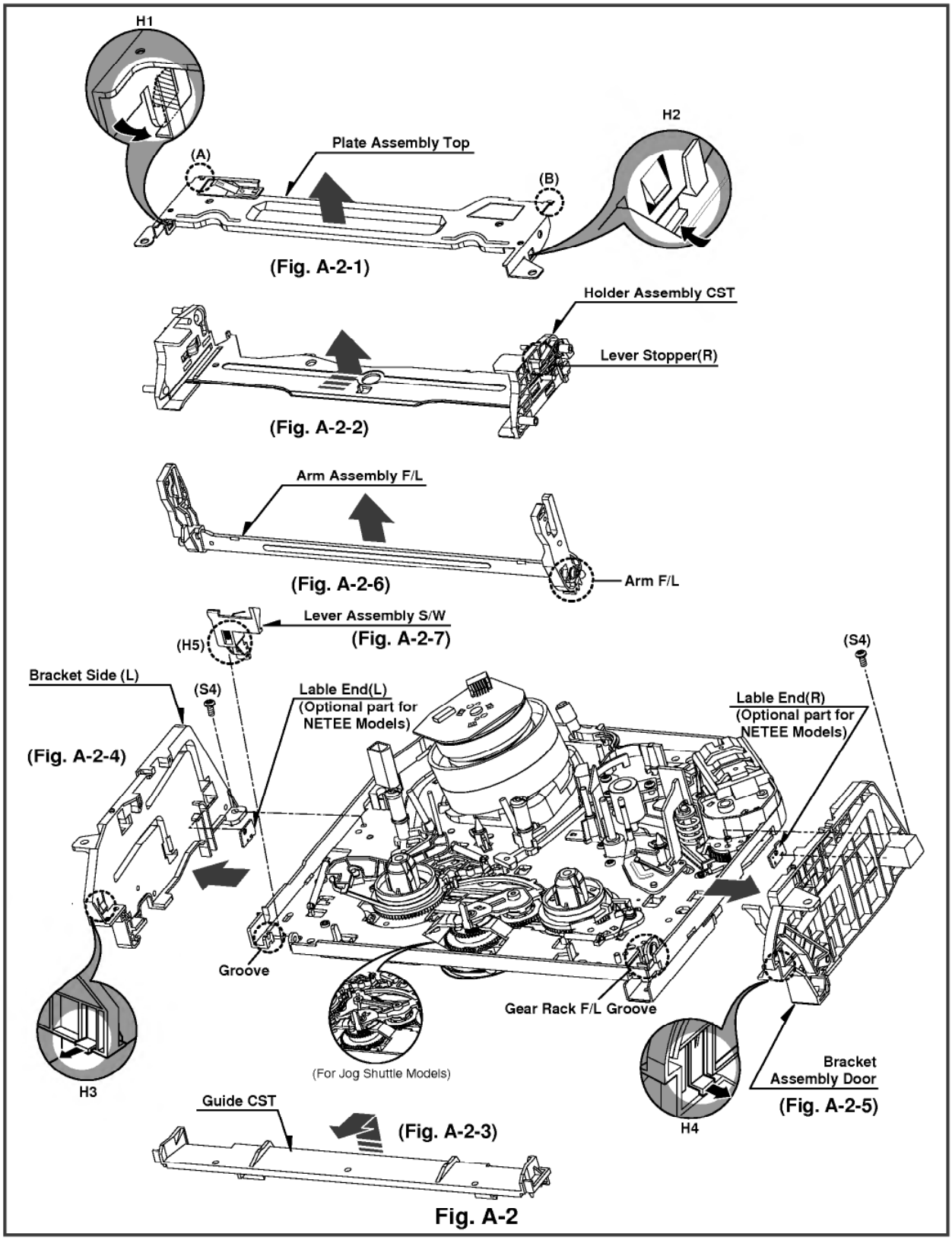


Fig. A-2

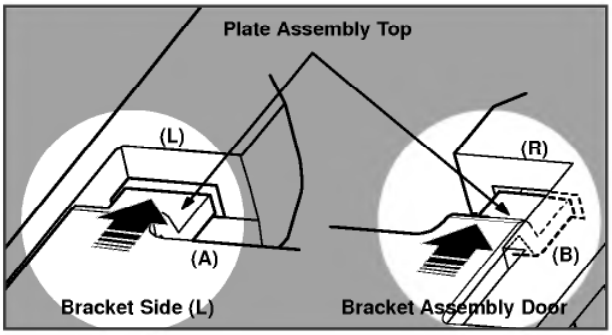
DECK MECHANISM DISASSEMBLY

2. Plate Assembly Top (Fig. A-2-1)

1) Unhook the (H1) and separate the Left Side.
2) Unhook the (H2) and lift up the Plate Assembly Top.

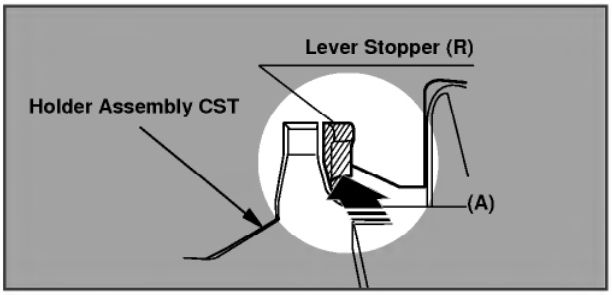
NOTE

(1) When reassembling, confirm (A),(B) Part of the Plate Assembly Top is inserted to the (L),(R) Grooves of the Bracket Side(L) and Bracket Assembly Door.

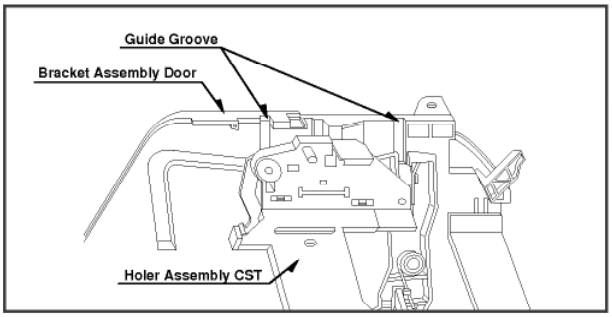


3. Holder Assembly CST (Fig.A-2-2)

1) Push the Lever Stopper (R) in the direction of the arrows (A) and move the Holder Assembly CST.

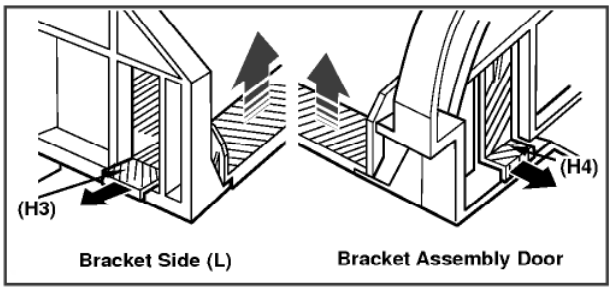


2) Push the Bracket Assembly Door to the right and lift up the Holder Assembly CST along the Guide Groove of the Bracket Assembly Door.



4. Guide CST (Fig.A-2-3)

1) Unhook(H3) in the direction of the arrow and separate the left side.
2) Unhook (H4) as above No.1) and disassemble the Guide CST in the direction of the arrow.



5. Bracket Side(L) (Fig. A-2-4)/ Bracket Assembly Door (Fig.A-2-5)

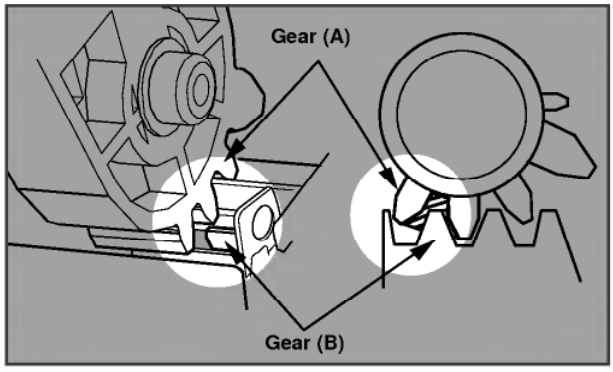
1) Remove the Screw (S4) and disassemble the Bracket Side(L) in the front.
2) Remove the Screw (S4) and disassemble the Bracket Assembly Door in the front.

6. Arm Assembly F/L (Fig. A-2-6)

1) Push the Arm Assembly F/L to the left and lift up it.

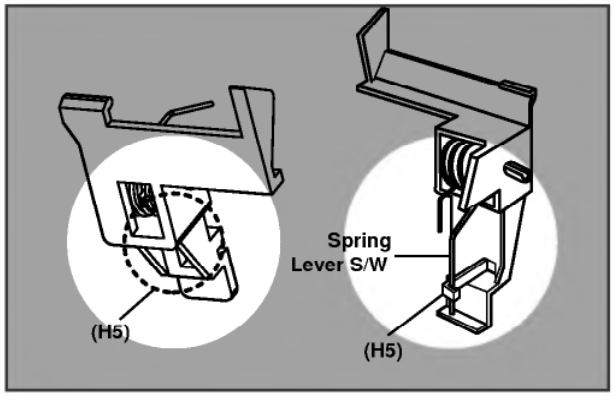
NOTE

(1) When reassembling, confirm that the Gear(A) of the Arm F/L and the Gear(B) of the Gear Rack F/L are assembled as below.



7. Lever Assembly S/W (Fig. A-2-7)

1) Hook the Spring Lever S/W on (H5).
2) Lift up the left side of the Lever S/W from the Groove(A) of the Chassis.



DECK MECHANISM DISASSEMBLY

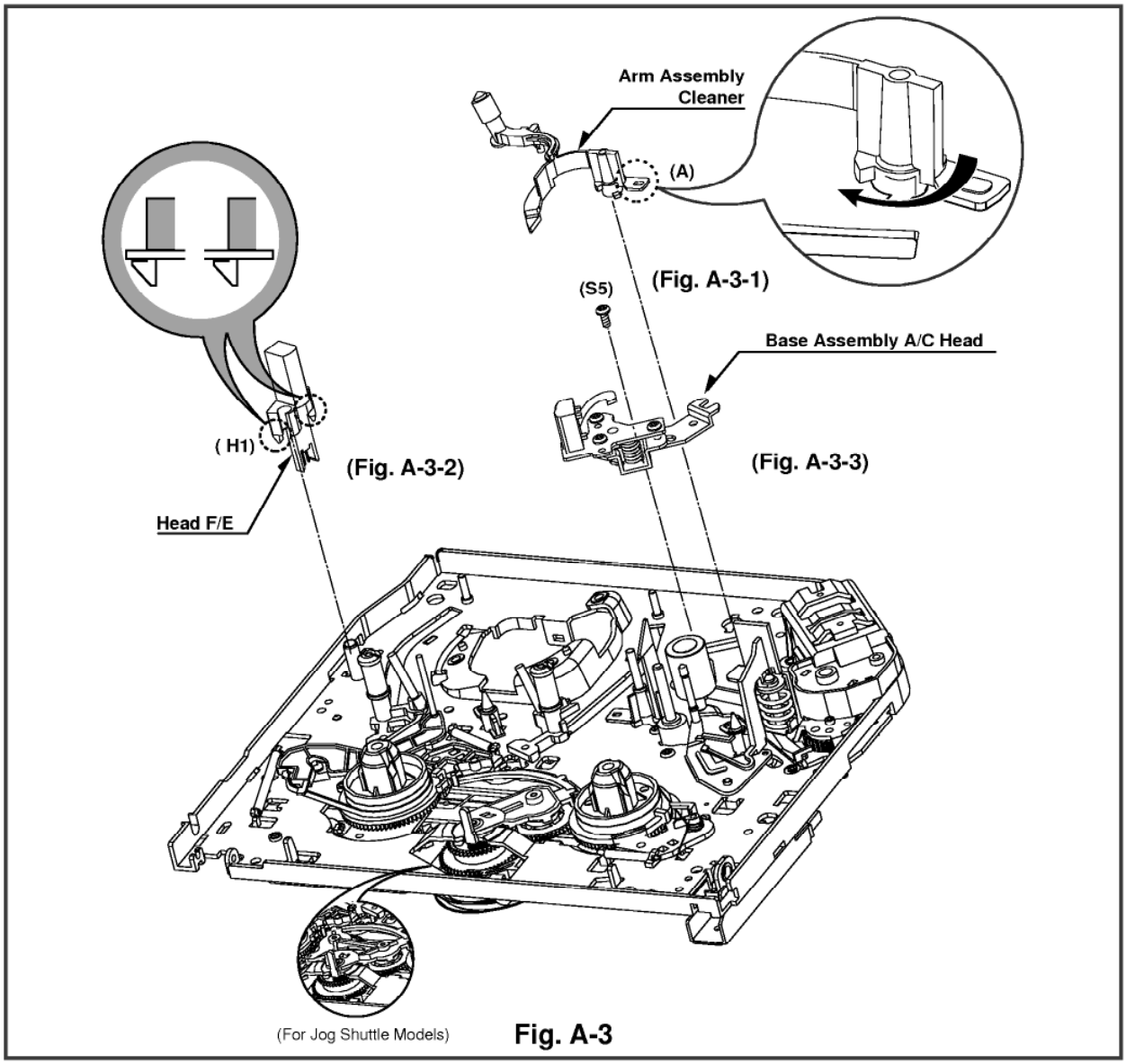
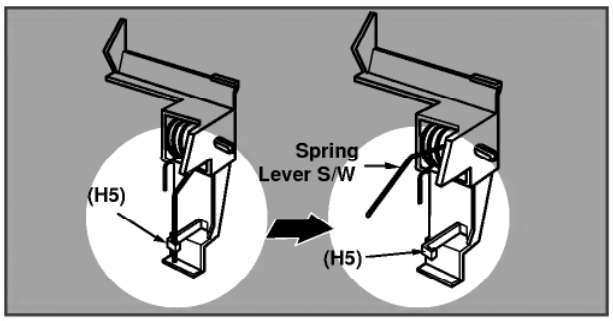


Fig. A-3

NOTE

(1) Place the Spring Lever S/W of the above (No.1) as original position.



8. Arm Assembly Cleaner(Fig. A-3-1)

1) Break away the (A) part shown above Fig. A-3-1 from the Embossing of the Chassis in the clockwise direction and lift up the Arm Assembly Cleaner.

9. Head F/E (Fig. A-3-2)

1) Unhook the two Hooks (H1) on the back side of the Chassis and lift up the Head F/E.

10. Base Assembly A/C Head (Fig. A-3-3)

1) Remove the Screw (S5) and lift up the Base Assembly A/C Head.

DECK MECHANISM DISASSEMBLY

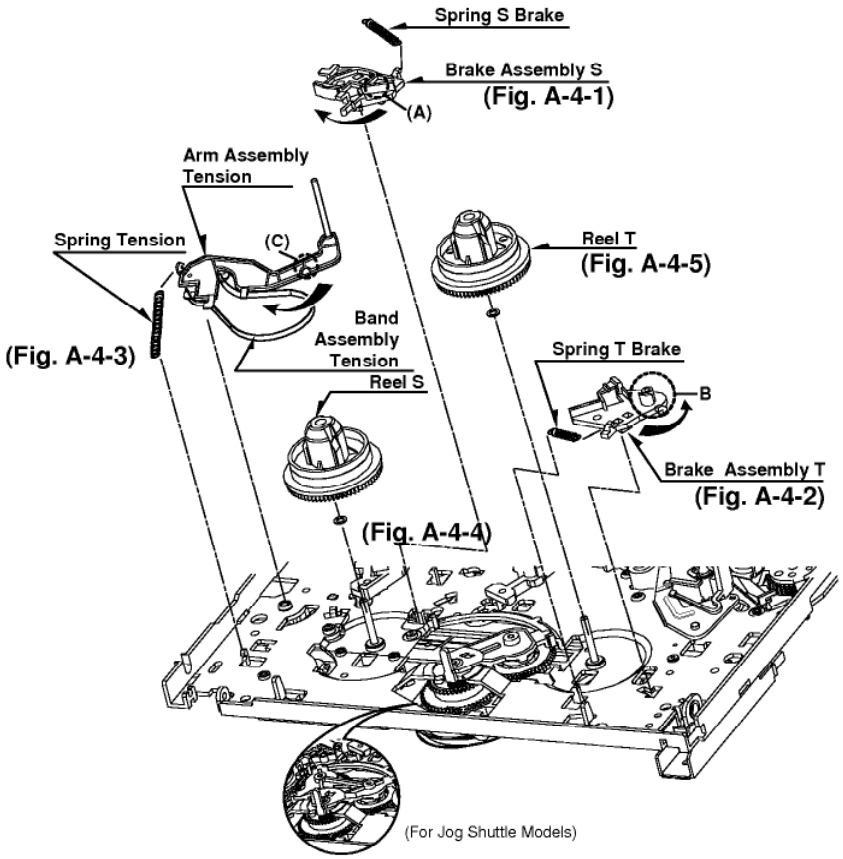


Fig. A-4

11. Brake Assembly S (Fig. A-4-1)

1) Remove the Spring S Brake.
2) Hold the (A) part shown above Fig. A-4-1 and turn to the clockwise direction, and then lift up the Brake Assembly S.

NOTE

(1) When reassembling, be careful not to change the Spring with below No.12.(Refer to Fig. B-2).

12. Brake Assembly T (Fig. A-4-2)

1) Remove the Spring T Brake.
2) Hold the (B) part shown above Fig. A-4-2 and turn to the counterclockwise direction, and then lift up the Brake Assembly T.

NOTE

(1) When reassembling, be careful not to change the Spring with above No.11.(Refer to Fig. B-2).

(Difference for Springs) **(Fig. B-2)**

	Spring T Brake Color (Black)
	Spring S Brake
	Spring Tension

13. Arm Assembly Tension (Fig. A-4-3)

1) Remove the Spring Tension.
2) Hold the (C) part shown above Fig. A-4-3 and turn to the clockwise direction, and then lift up the Arm Assembly Tension.

NOTE

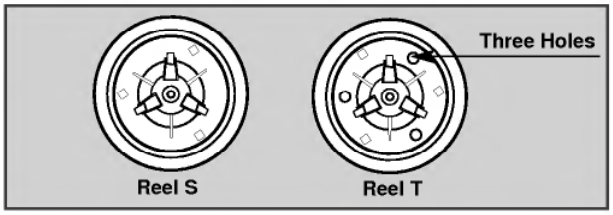
(1) When reassembling, be careful not to change the Spring with above No.11,12.(Refer to Fig. B-2).

14. Reel S (Fig. A-4-4) & Reel T (Fig. A-4-5)

1) Lift up the Reel S and Reel T.

NOTE

(1) When reassembling, be careful not to change the Reel S and Reel T each other.



(2) Confirm two Slide Washers under the Reel S and Reel T.

DECK MECHANISM DISASSEMBLY

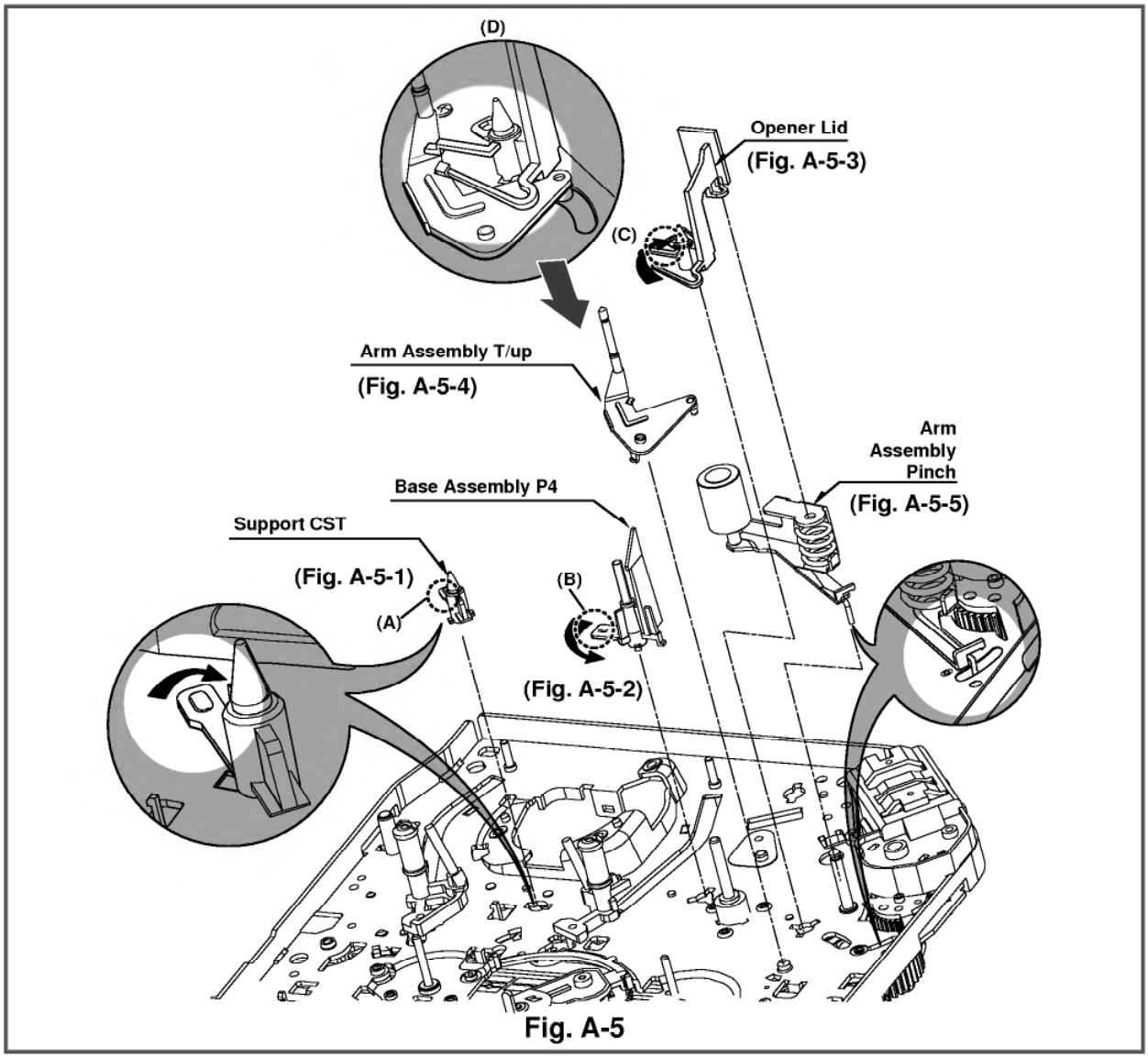


Fig. A-5

15. Support CST (Fig. A-5-1)

1) Break away the (A) part shown above Fig. A-5-1 from the Embossing of the Chassis in the clockwise direction, and lift up the Support CST.

16. Base Assembly P4 (Fig. A-5-2)

1) Break away the (B) part shown above Fig. A-5-2 from the Embossing of the Chassis in the counterclockwise direction and lift up the Base Assembly P4.

17. Opener Lid (Fig. A-5-3)

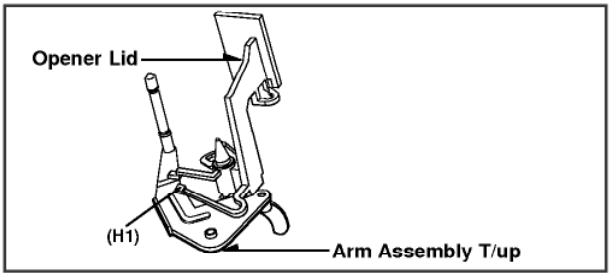
1) Break away the (C) Part of the Opener Lid from the Embossing of the Chassis in the Clockwise direction and lift up the Opener Lid.

18. Arm Assembly T/up (Fig. A-5-4)

1) Just lift up the Arm Assembly T/UP.

NOTE

(1) When reassembling, confirm the opener lid is placed on the Hook(H1) of the Arm Assembly T/UP as below figure.



19. Arm Assembly Pinch (Fig. A-5-5)

1) Lift up the Arm Assembly Pinch.

DECK MECHANISM DISASSEMBLY

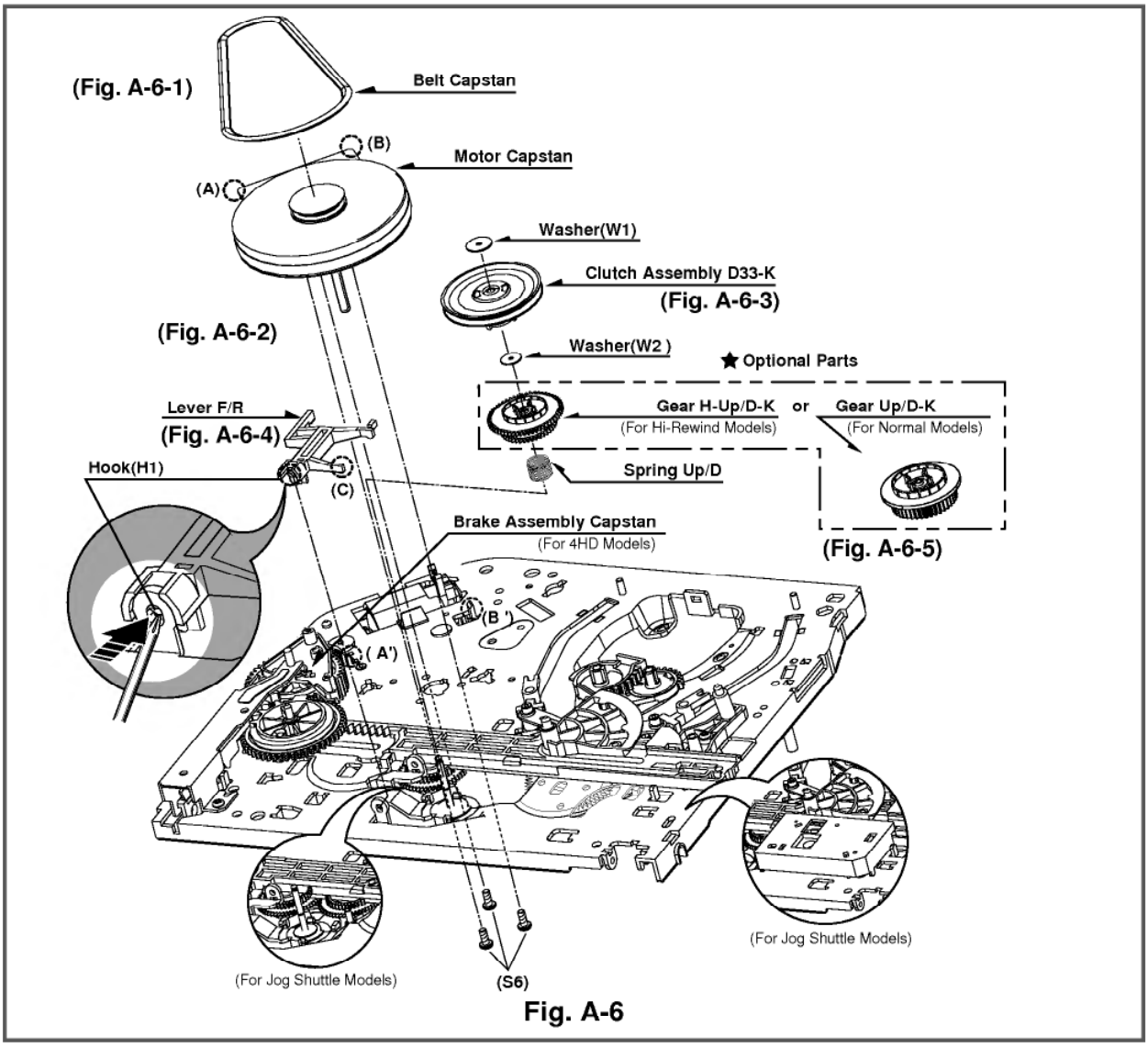


Fig. A-6

20. Belt Capstan (Fig. A-6-1)/ Motor Capstan (Fig. A-6-2)

1) Remove the Belt Capstan.
2) Remove three Screws(S6) on the back side of the Chassis and lift up the Motor Capstan.

NOTE

(1) When reassembling, Confirm the (A), (B) parts of Motor Capstan is located to the (A'), (B') of the Chassis.

21. Clutch Assembly D33-K (Fig. A-6-3)

1) Remove the Washer(W1) and lift up the Clutch Assembly D33-K.

22. Lever F/R (Fig. A-6-4)

1) Unhook the (H1) shown above Fig. A-6-4 and lift up the Lever F/R.

NOTE

(1) When reassembling, move the (C) part of the Lever F/R up and down, then confirm if it is returned to original position.

23. Gear H-Up/D-K or Gear Up/D-K (Fig. A-6-5)

1) Remove the Washer(W2) and lift up the Gear H-up/D-K.
2) Remove the Spring Up/D.

NOTE

(1) Gear H-Up/D-K is for Hi-Rewind Models.
(2) Gear Up/D-K is for Normal Models except Hi-Rewind Models.

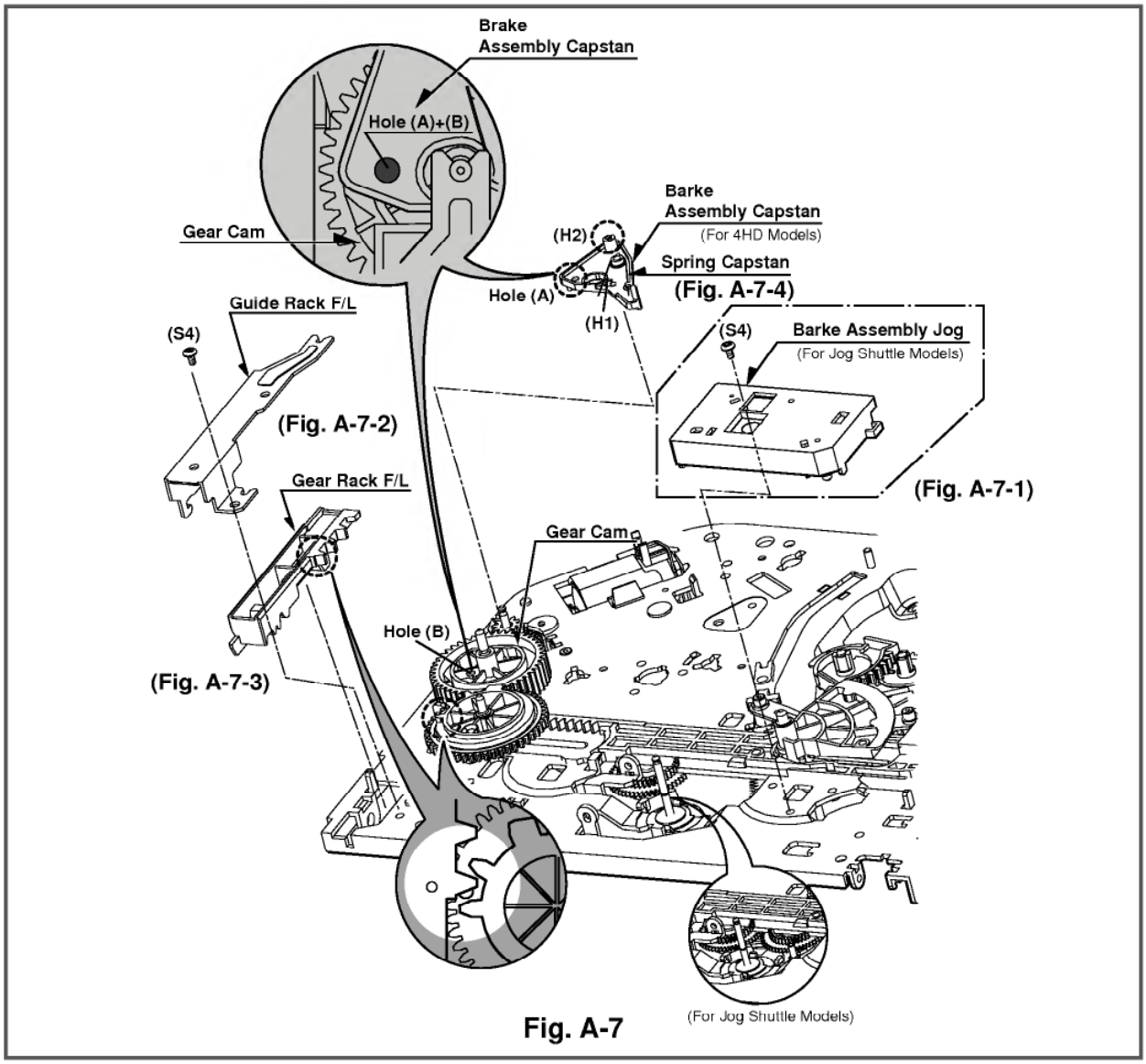


Fig. A-7

24. Bracket Assembly Jog (Fig. A-7-1) (Jog shuttle model option)

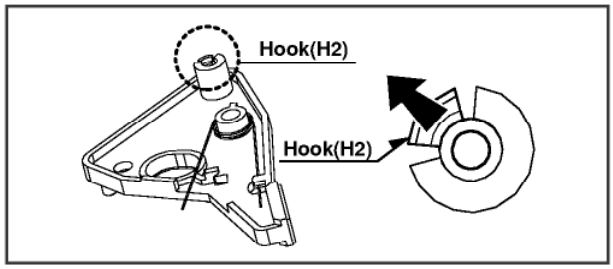
1) Remove the Screw(S4) and lift up the Bracket Assembly Jog.

25. Guide Rack F/L (Fig. A-7-2)/ Gear Rack F/L (Fig. A-7-3)

1) Remove the Screw(S4) and lift up the Guide Rack F/L.
2) Lift up the Gear Rack F/L.

26. Brake Assembly Capstan (Fig. A-7-4) (4HD model option)

1) Hook the Spring Capstan on the Hook(H1).
2) Unhook the Hook(H2) and lift up the Brake Assembly Capstan.(Refer to Fig. to the right)



NOTE

(1) When reassembling, confirm that the Hole(A) of the Brake Assembly Capstan is aligned to the Hole(B) of the Gear Cam.
(Refer to above Fig. A-7-4).

DECK MECHANISM DISASSEMBLY

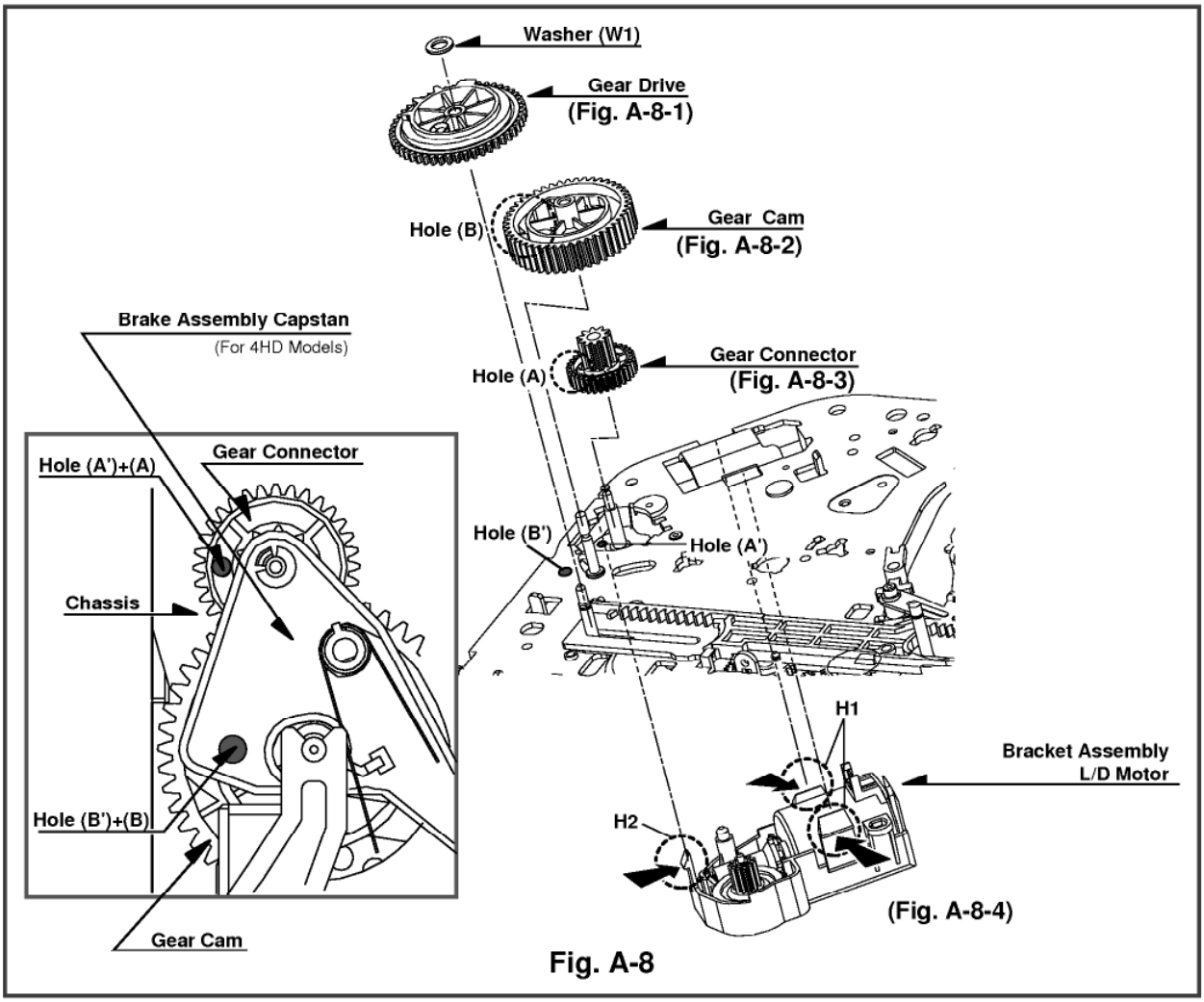


Fig. A-8

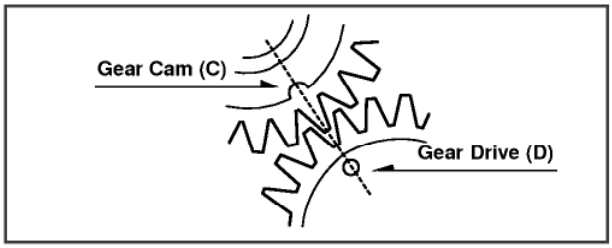
27. Gear Drive (Fig. A-8-1)/ Gear Cam (Fig. A-8-2)/ Gear Connector (Fig. A-8-3)

1) Remove the Washer(W1) and lift up the Gear Drive.
2) Lift up the Gear Cam.
3) Lift up the Gear Connector.

NOTE

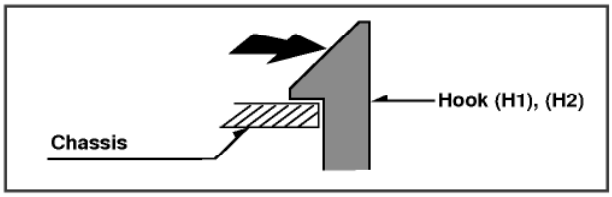
(1) When reassembling, confirm that the Hole (A) of the Gear Connector is aligned to the Hole (A') of the Chassis (Fig. A-8-3).
(2) When reassembling, confirm that the Hole (B) of the Gear Cam is aligned to the Hole (B') of the Chassis (Fig. A-8-2).
(3) When reassembling, confirm that the (C) part of the Gear Cam is aligned to the (D) part of the Gear Drive as shown Fig. B-3

(Fig. B-3)



28. Bracket Assembly L/D Motor (Fig. A-8-4)

1) Unhook the three Hooks(H1),(H2) and push down the Bracket Assembly L/D Motor.



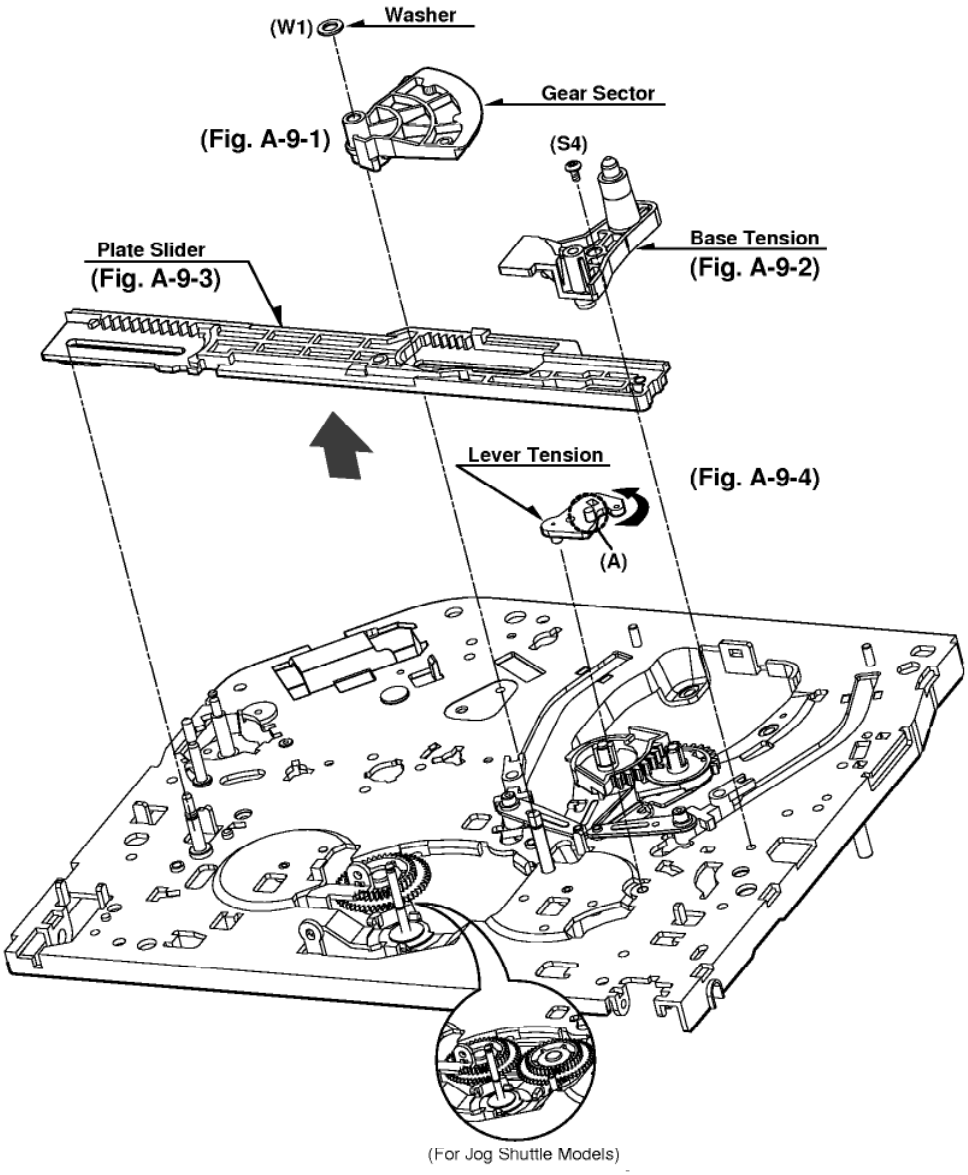


Fig. A-9

29. Gear Sector (Fig. A-9-1)

1) Remove the Washer(W1) and lift up the Gear Sector.

30. Base Tension (Fig. A-9-2)/ Plate Slider (Fig. A-9-3)/ Lever Tension (Fig. A-9-4)

1) Remove the Screw(S4) and lift up the Base Tension.
2) Lift up the Plate Slider.
3) Hold the (A) Part of the Lever Tension and turn to the counterclockwise direction, and then lift up the Lever Tension.

NOTE

(1) When reassembling, turn the Lever Tension to the clockwise direction in maximum.
(2) Push the plate slide right side to be guided by the shaft.

DECK MECHANISM DISASSEMBLY

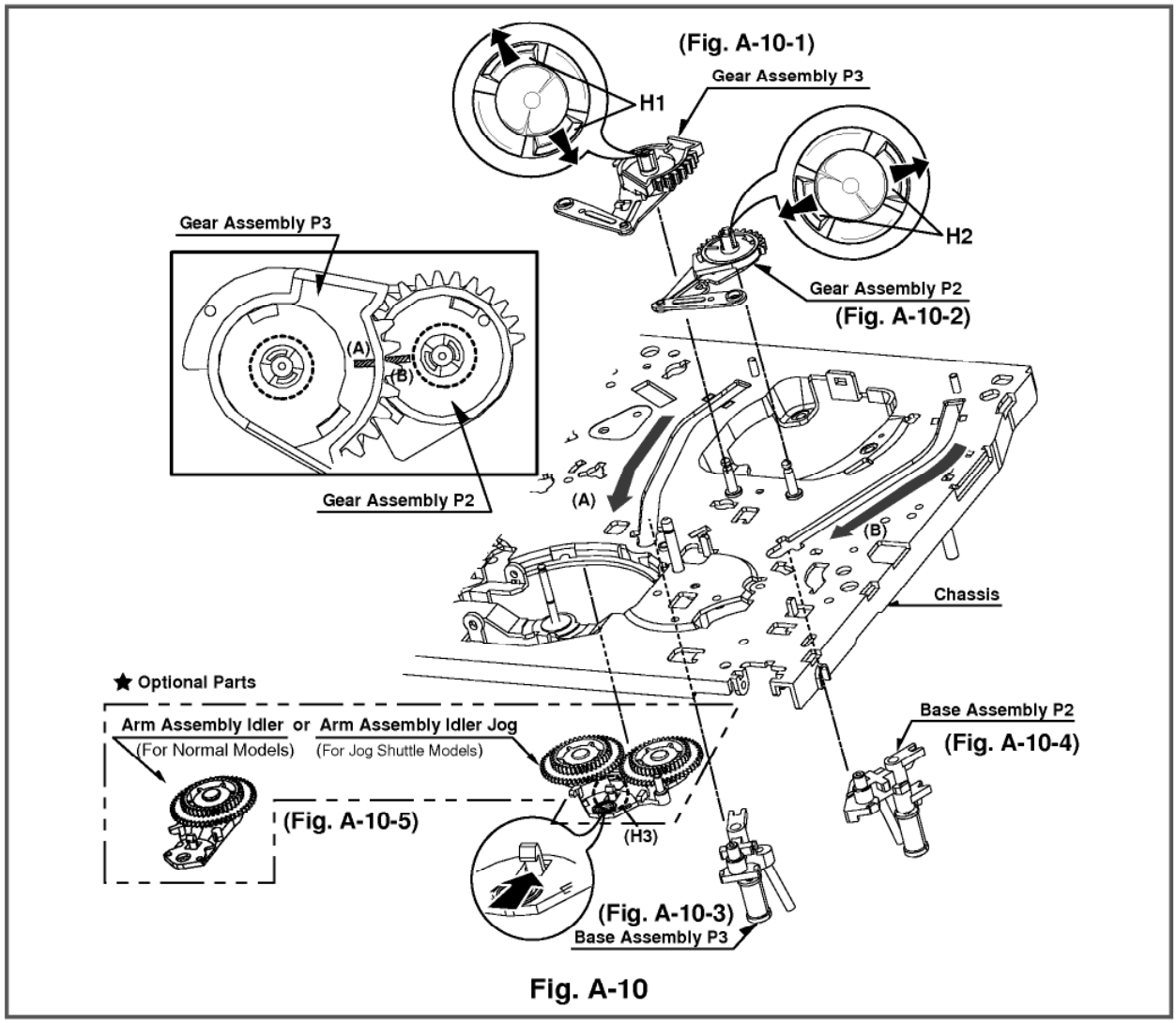


Fig. A-10

31. Gear Assembly P3 (Fig. A-10-1)/ Gear Assembly P2 (Fig. A-10-2)

1) Unhook the two Hooks(H1) and lift up the Gear Assembly P3.
2) Unhook the two Hooks(H2) and lift up the Gear Assembly P2.

32. Base Assembly P3 (Fig. A-10-3)/ Base Assembly P2 (Fig. A-10-4)

1) Move the Base Assembly P3 in the direction of the arrow of the Chassis Hole(A) and push down the Base Assembly P3.
2) Move the Base Assembly P2 in the direction of the arrow of the Chassis Hole(B) and push down the Base Assembly P2.

33. Arm Assembly Idler or Arm Assembly Idler Jog(Fig. A-10-5)

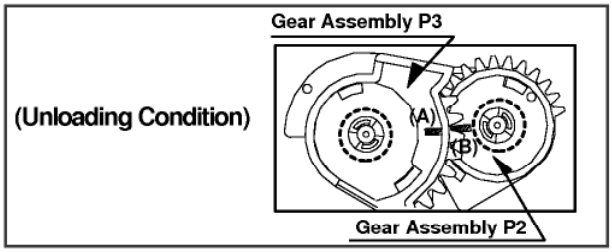
1) Unhook the Hook(H3) and push down the Arm Assembly Idler Jog.

NOTE

1) Arm Assembly Idler is for Normal Models.
2) Arm Assembly Idler Jog is for Jog Shuttle Models.

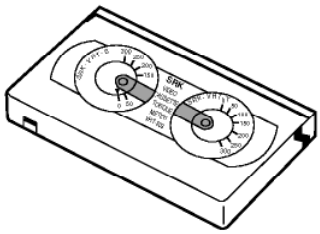
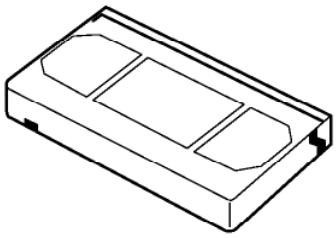
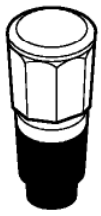
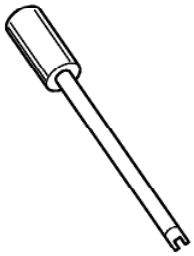
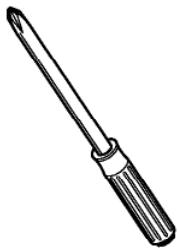
NOTE

1) When reassembling, confirm that the (A) Part of the Gear Assembly P3 is aligned to the (B) Part of the Gear Assembly P2 as shown below.



DECK MECHANISM DISASSEMBLY

• Tools and Fixfures for Service

1. Cassette Torque meter SRK-VHT-303(Not SVC part) Parts No: D00-D006 	2. Alignment tape Parts No NTSC: DTN-001 PAL:DTN-0002 	3. Torque gauge 600g.Cm ATG Parts No:D00-D002 
4. Torque gauge adaptor Parts No:D09-R001 	5. Post height adjusting driver Parts No:DTL-0005 	6. + Type driver (ø 5) 

DECK MECHANISM ADJUSTMENT(FOR NORMAL MODELS)

1.Mechanism Alignment Position Check

Purpose:To determine if the Mechanism is in the correct position, when a Tape is ejected.

Test Equipment/ Fixture	Test Conditions (Mechanism Condition)	Check Point
• Blank tape	• Eject Mode (with Cassette ejected)	• Mechanism and Mode Switch Position

1) Turn the Power S/W on and eject the Cassette by pressing the Eject Button.
2) Remove the Top Cover and Plate Assembly Top, visually check if the Gear Cam Hole is aligned with the Chassis Hole as below Fig. C-2.
3) IF not, rotate the Shaft of the Loading Motor to either Clockwise or Counterclockwise until the Alignment is as below Fig. C-2.
4) Remove the Screw which fixes the Deck Mechanism and Main Frame and confirm if the Gear Cam is aligned with the Gear Drive as below Fig. C-1(A).
5) Confirm if the Mode S/W on the Main P.C.Board is aligned as below Fig. C-1(B).
6) Remount the Deck Mechanism on the Main P.C.Board and check each operation.

CHECK DIAGRAM

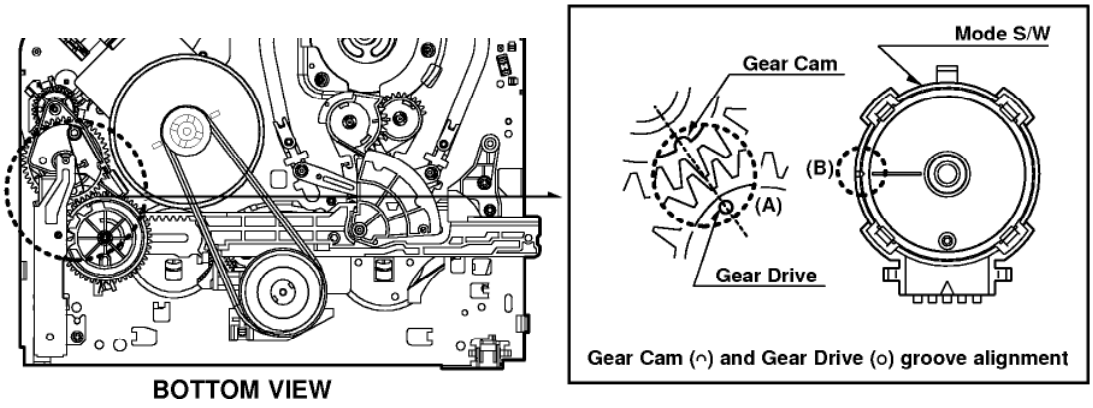


Fig. C-1

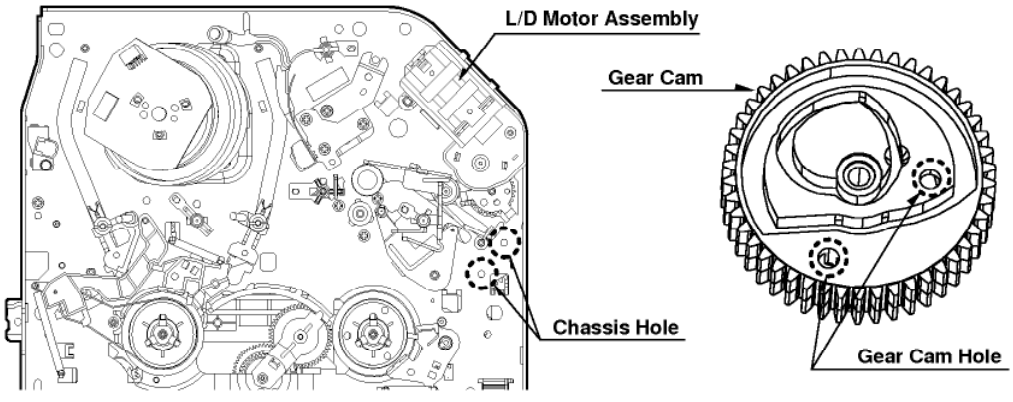


Fig. C-2

DECK MECHANISM ADJUSTMENT(FOR JOG SHUTTLE MODELS)

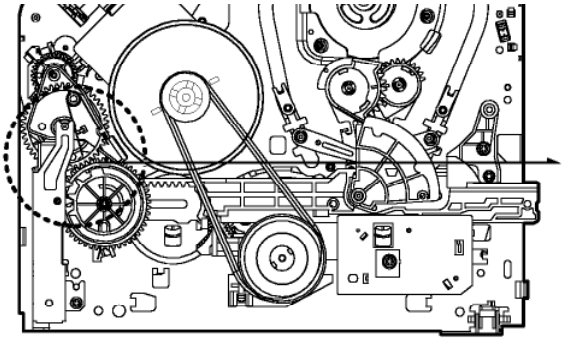
1.Mechanism Alignment Position Check

Purpose:To determine if the Mechanism is in the correct position, when a Tape is ejected.

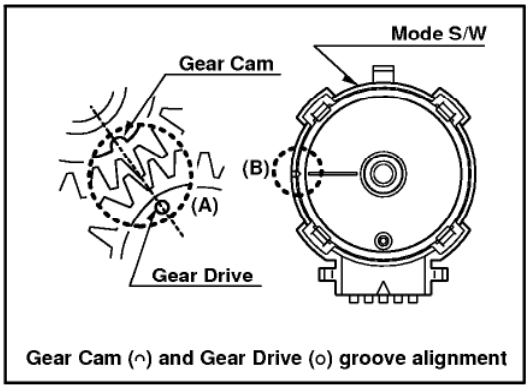
Test Equipment/ Fixture	Test Conditions (Mechanism Condition)	Check Point
• Blank tape	• Eject Mode (with Cassette ejected)	• Mechanism and Mode Switch Position

1) Turn the Power S/W on and eject the Cassette by pressing the Eject Button.
2) Remove the Top Cover and Plate Assembly Top, visually check if the Gear Cam Hole is aligned with the Chassis Hole as below Fig. C-2.
3) IF not, rotate the Shaft of the Loading Motor to either Clockwise or Counterclockwise until the Alignment is as below Fig. C-2.
4) Remove the Screw which fixes the Deck Mechanism and Main Frame and confirm if the Gear Cam is aligned with the Gear Drive as below Fig. C-1(A).
5) Confirm if the Mode S/W on the Main P.C.Board is aligned as below Fig. C-1(B).
6) Remount the Deck Mechanism on the Main P.C.Board and check each operation.

CHECK DIAGRAM

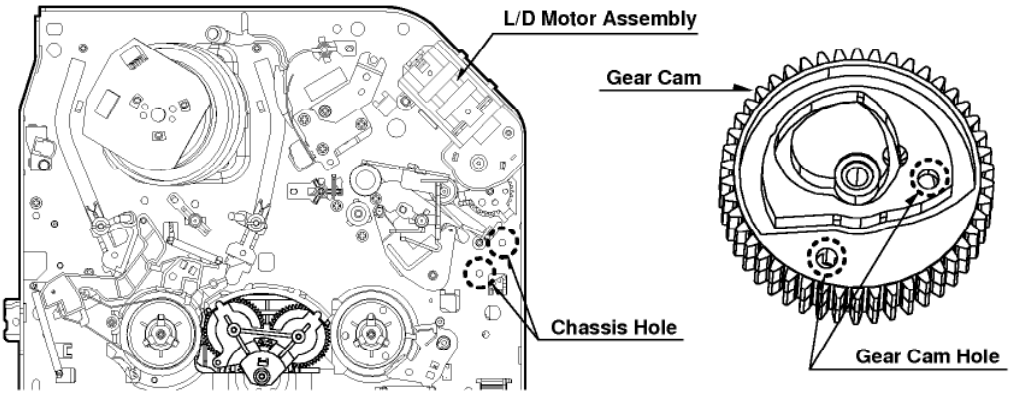


BOTTOM VIEW



Gear Cam (∩) and Gear Drive (o) groove alignment

Fig. C-1



TOP VIEW

Fig. C-2

DECK MECHANISM ADJUSTMENT

2. Preparation for Adjustment (To set the Deck Mechanism to the Loading state without inserting a Cassette Tape).

1) Unplug the Power Cord from the AC Outlet.
2) Disassemble the Top Cover and Plate Assembly Top.
3) Plug the Power Cord into the AC Outlet.
4) Turn the Power S/W on and push the Lever Stopper (L),(R) of the Holder Assembly CST to the back for Loading the Cassette without Tape.
   Cover the Holes of the End Sensors at the both sides of the Bracket Side(L) and Bracket Assembly Door to prevent a light leak.
   Then The Deck Mechanism drives to the Stop Mode.
   In this case, The Deck Mechanism can accept inputs of each mode, however the Rewind and Review Operation can not be performed for more than a few seconds because the Take-up Reel Table is in the Stop State and can not be detected the Reel Pulses.

3. Checking Torque

Purpose: To insure smooth Transport of the Tape during each Mode of Operation.
If the Tape Transport is abnormal, then check the Torque as indicated by the chart below.

Test Equipment/ Fixture	Test Conditions (Mechanism Condition)	Checking Method
• Torque Gauge(600g/cm ATG) • Torque Gauge Adaptor • Cassette Torque Meter SRK-VHT-303	• Play (FF) or Review (REW) Mode	• Perform each Deck Mechanism Mode without inserting a Cassette Tape(Refer to above No.2 Preparation for Adjustment). • Read the Measurement of the Take-up or Supply Reels on the Cassette Torque Meter(Fig. C-3-2). • Attach the Torque Gauge Adaptor to the Torque Gauge and then read the Value of it(Fig. C-3-1).

Item	Mode	Test Equipment	Measurement Reel	Measurement Values
Fast Forward Torque	Fast Forward	Cassette Torque Gauge	Take-Up Reel	More than 400g/cm
Rewind Torque	Rewind	Cassette Torque Gauge	Supply Reel	More than 400g/cm
Play Take-Up Torque	Play	Cassette Torque Meter	Take-Up Reel	70~120g/cm
Review Torque	Review	Cassette Torque Meter	Supply Reel	130~210g/m

NOTE:

The Values are measured by using a Torque Gauge and Torque Gauge Adaptor with the Torque Gauge affixed.

• Cassette Torque Meter (SRK-VHT-303)

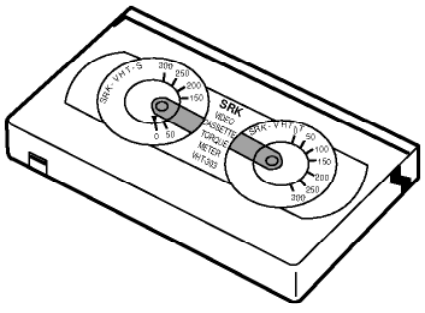


Fig. C-3-2

NOTE:

The Torque reading to measure occurs when the Tape abruptly changes direction from Fast Forward of Rewind Mode, when quick bracking is applied to both Reels.

• Torque Gauge (600g.cm ATG)

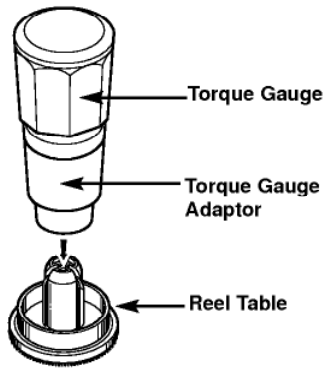


Fig. C-3-1

DECK MECHANISM ADJUSTMENT

4.Guide Roller Height Adjustment

Purpose: To regulate the Height of the Tape so that the Bottom of the Tape runs along the Tape Guide Line on the Lower Drum.

4-1. Preliminary Adjustment

Test Equipment/ Fixture	Test Conditions (Mechanism Condition)	Adjustment Point
• Post Height Adjusting Driver	• Play or Review Mode	• Guide Roller Height Adjustment screws on the Supply and Take-Up Guide Rollers.

Adjustment Procedure

1) Confirm if the Tape runs along the Tape Guide Line of the Lower Drum.
2) If the Tape runs the Bottom of the Guide Line, turn the Guide Roller Height Adjustment Screw to Clockwise direction.
3) If it runs the Top, turn to Counterclockwise direction.
4) Adjust the Height of the Guide Roller to be guided to the Guide Line of the Lower Drum from the Starting and Ending Point of the Drum.

ADJUSTMENT DIAGRAM

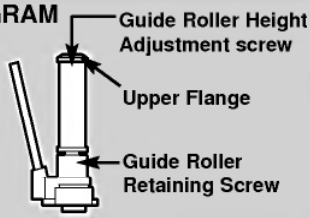


Fig. C-4-1

4-2. Precise Adjustment

Test Equipment/Fixture	Test Equipment Connection Points	Test Conditions VCR(VCP) State	Adjustment Point
• Oscilloscope • Alignment Tape • Post Height Adjusting Driver	• CH-1:PB RF Envelope • CH-2:NTSC: SW 30Hz PAL: SW 25Hz • Head Switching Output Point • RF Envelope Output Point	• Play an Alignment Tape	• Guide Roller Height Adjustment Screws

Adjustment Procedure

1) Play an Alignment Tape after connecting the Probe of the Oscilloscope to the RF Envelope Output Test Point and Head Switching Output Test Point.
2) Tracking Control(in PB Mode) : Center Position(When this Adjustment is performed after the Drum Assembly has been replaced, set the Tracking Control so that the RF Output is Maximum).
3) Height Adjustment Screw : Flatten the RF Waveform. (Fig. C-4-2)
4) Turn(Move) the Tracking Control(in PB Mode) Clockwise and Counterclockwise.(Fig. C-4-3)
5) Check that any Drop of RF Output is uniform at the Start and End of the Waveform.

NOTE

If the adjustment is excessive or insufficient the tape will jam or fold.

Waveform Diagrams

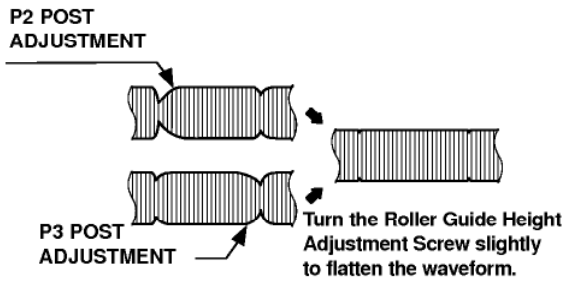


Fig. C-4-2

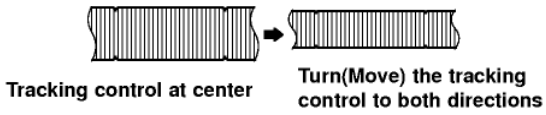
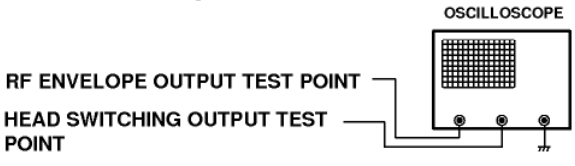


Fig. C-4-3

Connection Diagram



DECK MECHANISM ADJUSTMENT

5. Audio/Control (A/C) Head Adjustment

Purpose: To insure that the Tape passes accurately over the Audio and Control Tracks in exact Alignment in both the Record and Playback Modes.

5-1. Preliminary Adjustment (Height and Tilt Adjustment)
Perform the Preliminary Adjustment, when there is no Audio Output Signal with the Alignment Tape.

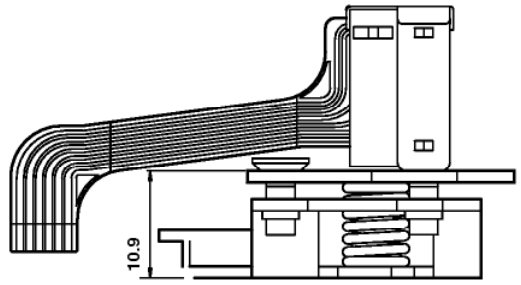
Test Equipment/ Fixture	Test Conditions (Mechanism Condition)	Adjustment Point
• Blank Tape • Screw Driver(+) Type 5mm	• Play the blank tape	• Tilt Adjustment Screw(C) • Height Adjustment Screw(B) • Azimuth Adjustment Screw(A)

Adjustment Procedure/Diagrams

1) Initially adjust the Base Assembly A/C Head as shown Fig. C-5-1 by using the Height Adjustment Screw(B).
2) Play a Blank Tape and observe if the Tape passes accurately over the A/C Head without Tape Curling or Folding.
3) If Folding or Curling is occured then adjust the Tilt Adjustment Screw(C) while the Tape is running to resemble Fig. C-5-3.
4) Reconfirm the Tape Path after Playback about 4~5 seconds.

NOTE

Ideal A/C head height occurs, when the tape runs between 0.2~0.25mm above the bottom edge of the A/C head core.



A/C Head Base

Fig. C-5-1

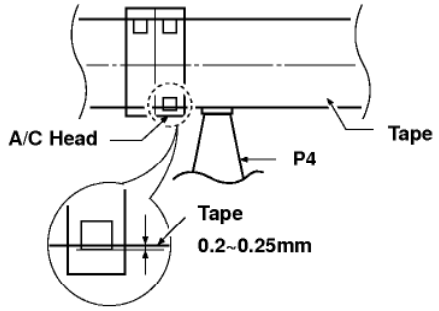
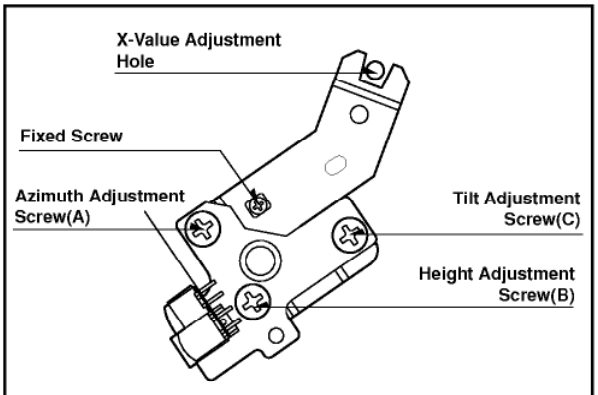


Fig. C-5-3



A/C Head Assembly

Fig. C-5-2

5-2. Confirm that the Tape passes smoothly between the Take-up Guide and Pinch Roller(using a Mirror or the naked eye).

1) After completing Step 5-1.(Preliminary Adjustment), check that the Tape passes around the Take-up Guide and Pinch Roller without Folding or Curling at the Top or Bottom.
   (1) If Folding or Curling is observed at the Bottom of the Take-up Guide then slowly turn the Tilt Adjustment Screw(C) in the Clockwise direction.
   (2) If Folding or Curling is observed at the Top of it then slowly turn the Tilt Adjustment Screw(C) in the Counterclockwise direction.

NOTE:

Check the RF Envelope after adjusting the A/C Head, if the RF Waveform differs from Fig. C-5-4, performs Precise Adjustment to flat the RF Waveform.

5-3. Precise Adjustment (Azimuth adjustment)

Test Equipment/ Fixture	Connection Point	Test Conditions (Mechanism Condition)	Adjustment Point
• Oscilloscope • Alignment Tape(SP) • Screw Driver(+) Type 5mm	• Audio output jack	• Play an Alignment Tape 1KHz, 7KHz Sections	• Azimuth Adjustment Screw(A) • Height Adjustment Screw(B)

Adjustment Procedure

1) Connect the Probe of the Oscilloscope to Audio Output Jack.
2) Alternately adjust the Azimuth Adjustment Screw(A) and the Tilt Adjustment Screw(C) for Maximum Output of the 1Khz and 7Khz segments, while maintaining the flattest Envelope differential between the two Frequencies.

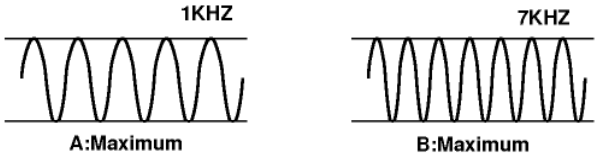
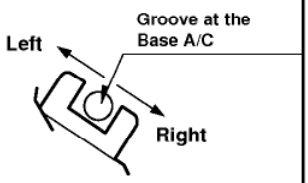


Fig. C-5-4

6. X-Value Adjustment

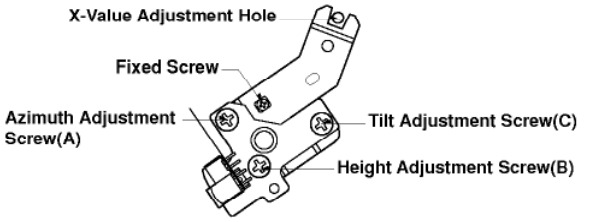
Purpose: To obtain compatibility with other VCR(VCP) Models.

Test Equipment/ Fixture	Connection Point	Test Conditions (Mechanism Condition)	Adjustment Point
• Oscilloscope • Alignment tape(SP only) • Screw Driver(+) Type 5mm	• CH-1: PB RF Envelope • CH-2: NTSC: SW 30Hz PAL: SW 25Hz • Head Switching Output Test Point • RF Envelope Output Test Point	• Play an Alignment Tape	

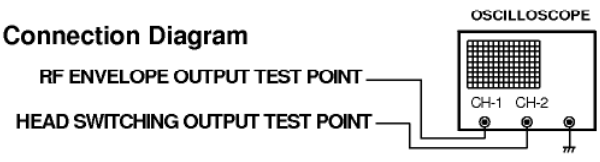
Adjustment Procedure

1) Release the Automatic Tracking to run long enough for Tracking to complete it's Cycle.
2) Loosen the Fixed Mounting Screw and move the Base Assembly A/C Head in the direction as shown in the Diagram to find the center of the peak that allows for the maximum Waveform Envelope.
   This method should allow the 31um Head to be centrally located over the 58um Tape Track.
3) Tighten the Base Assembly A/C Head mounting Screw.

Adjustment Diagram



Connection Diagram



DECK MECHANISM ADJUSTMENT

7. Adjustment after Replacing Drum Assembly (Video Heads)

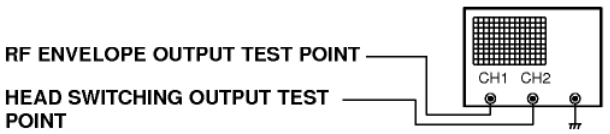
Purpose: To correct for shift in the Roller Guide and X value after replacing the Drum.

Test Equipment/ Fixture	Connection Point	Test Conditions (Mechanism Condition)	Adjustment Points
• Oscilloscope • Alignment tapes • Blank Tape • Post Height Adjusting Driver • Screw Driver(+) Type 5mm	• CH-1: PB RF Envelope • CH-2: NTSC: SW 30Hz PAL: SW 25Hz • Head Switching Output Test Point • RF Envelope Output Test Point	• Play the blank tape • Play an alignment tape	• Guide Roller Precise Adjustment • Switching Point • Tracking Preset • X-Value

Checking/Adjustment Procedure

Play a blank tape and check for tape curling or creasing around the roller guide. If there is a problem then follow the procedure 4. "Guide Roller Height" and 5. "Audio Control(A/C) Head Adjustment".

Connection Diagram



Waveform

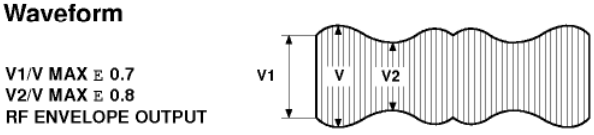


Fig. C-7

8. Check the Tape Travel after Reassembling Deck Assembly.

8-1.Check Audio and RF Locking Time during playback and after CUE or REV (FF/REW)

Test Equipment/ Fixture	Specification	Connection Points	Test Conditions (Mechanism Condition)
• Oscilloscope • Alignment tapes(with 6H 3kHz Color Bar Signal) • Stop Watch	• RF Locking Time: Less than 5 sec. • Audio Locking Time:Less than 10sec	• CH-1: PB RF Envelope • CH-2: Audio Output • RF Envelope Output Point • Audio Output Jack	• Play an alignment tape (with 6H 3kHz Color Bar Signal)

Checking Procedure

Play an alignment tape then change the operating mode to CUE or REV and confirm if the unit meets the above listed specifications.

NOTES:

1) CUE is fast forward mode (FF)
2) REV is the rewind mode (REW)
3) Referenced to the Play mode

8-2.Check for tape curling or jamming

Test Equipment/ Fixture	Specification	Test Conditions (Mechanism Condition)
• T-160 Tape • T-120 Tape	• Be sure there is no tape jamming or curling at the begining, middle or end of the tape.	• Run the CUE, REV play mode at the beginning and the end of the tape.

Checking Procedure

1) Confirm that the tape runs smoothly around the roller guides, drum and A/C head assemblies while abruptly changing operating modes from Play to CUE or REV. This is to be checked at the begining, middle and end sections of the cassette.
2) Confirm that the tape passes over the A/C head assembly as indicated by proper audio reproduction and proper tape counter performance.

1 Check before starting repairs

The following faults can be remedied by cleaning and oiling. Check the needed lubrication and the conditions of cleanliness in the unit.
Check with the customer to find out how often the unit is used, and then determine that the unit is ready for inspection and maintenance. Check the following parts.

Phenomenon	Inspection	Replacement
Color beats	Dirt on full-erase head	o
Poor S/N, no color	Dirt on video head	o
Vertical or Horizontal jitter	Dirt on video head Dirt on tape transport system	o
Low volume, Sound distorted	Dirt on Audio/control head	o
Tape does not run. Tape is slack	Dirt on pinch roller	o
In Review and Unloading (off mode), the Tape is rolled up loosely.	Clutch Assembly D33K Torque reduced	o
	Cleaning Drum and transport system	Fig. C-9-3

F/E Head
Video Head
A/C Head
Pinch Roller
Belt Capston
Clutch Assembly D33K

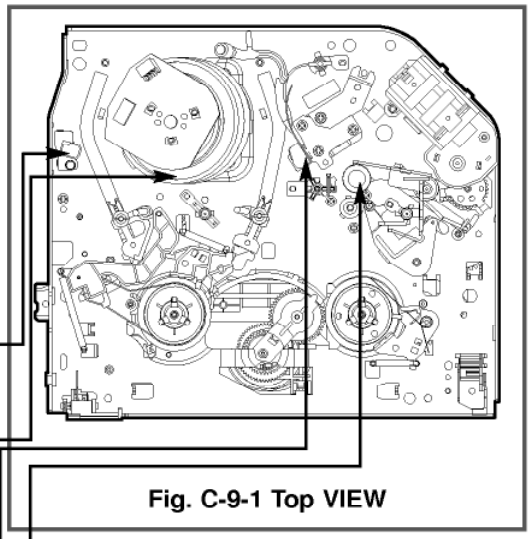


Fig. C-9-1 Top VIEW

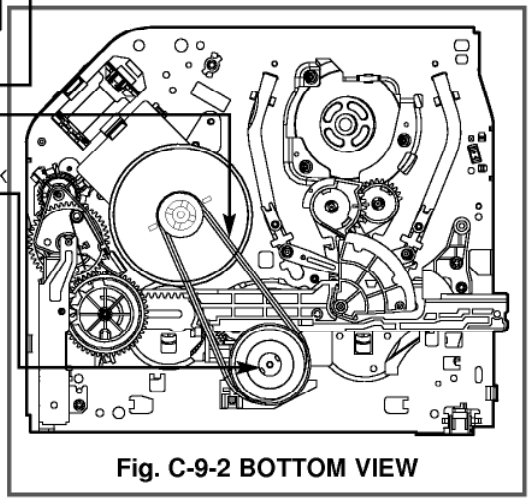


Fig. C-9-2 BOTTOM VIEW

NOTE

If locations marked with **o** do not operate normally after cleaning, check for wear and replace.
See the EXPLODED VIEWS at the end of this manual as well as the above illustrations See the Greasing (Page 4-22) for the sections to be lubricated and greased.

*** No. (1)~(13) Indicates the Tape Path to be traveled from Supply Reel to Take-up Reel.**

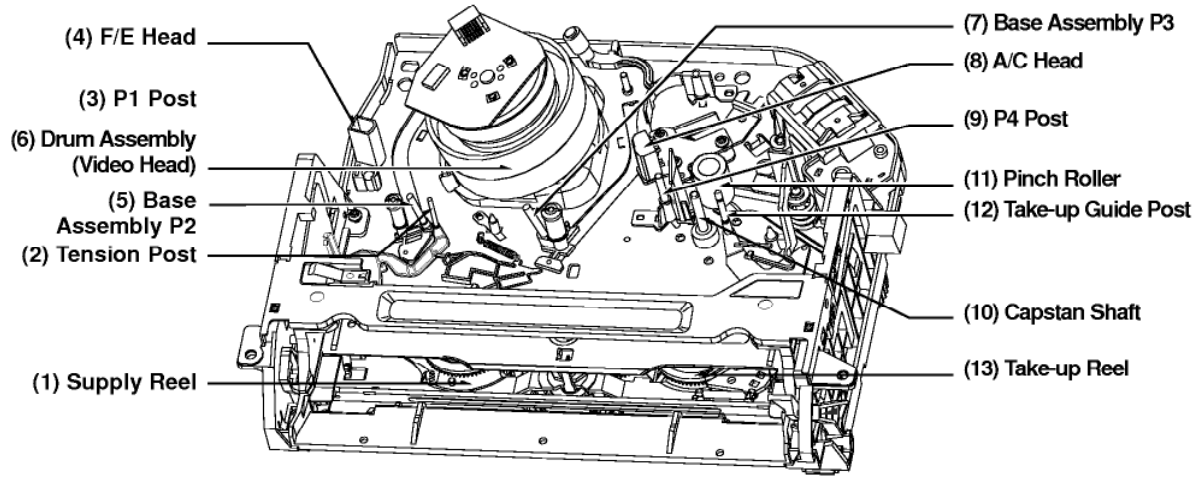


Fig. C-9-3 Tape Transport System

1 Check before starting repairs

The following faults can be remedied by cleaning and oiling. Check the needed lubrication and the conditions of cleanliness in the unit.
Check with the customer to find out how often the unit is used, and then determine that the unit is ready for inspection and maintenance. Check the following parts.

Phenomenon	Inspection	Replacement
Color beats	Dirt on full-erase head	o
Poor S/N, no color	Dirt on video head	o
Vertical or Horizontal jitter	Dirt on video head Dirt on tape transport system	o
Low volume, Sound distorted	Dirt on Audio/control head	o
Tape does not run. Tape is slack	Dirt on pinch roller	o
In Review and Unloading (off mode), the Tape is rolled up loosely.	Clutch Assembly D33K Torque reduced	o
	Cleaning Drum and transport system	Fig. C-9-3

F/E Head
Video Head
A/C Head
Pinch Roller
Belt Capston
Clutch Assembly D33K

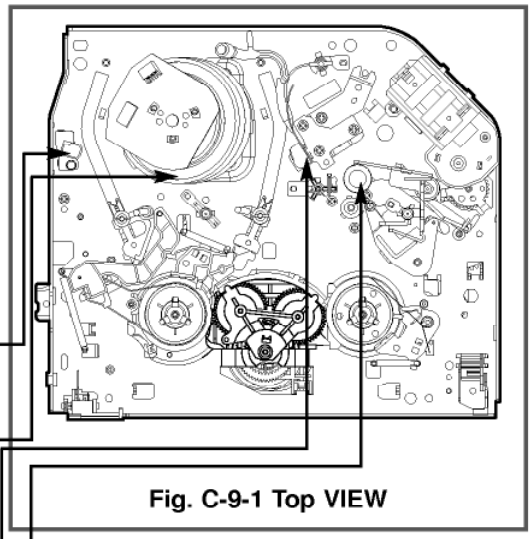


Fig. C-9-1 Top VIEW

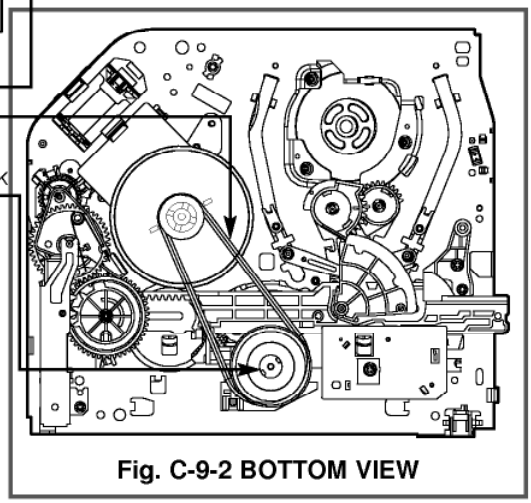


Fig. C-9-2 BOTTOM VIEW

NOTE

If locations marked with **o** do not operate normally after cleaning, check for wear and replace.
See the EXPLODED VIEWS at the end of this manual as well as the above illustrations See the Greasing (Page 4-22) for the sections to be lubricated and greased.

*** No. (1)~(13) Indicates the Tape Path to be traveled from Supply Reel to Take-up Reel.**

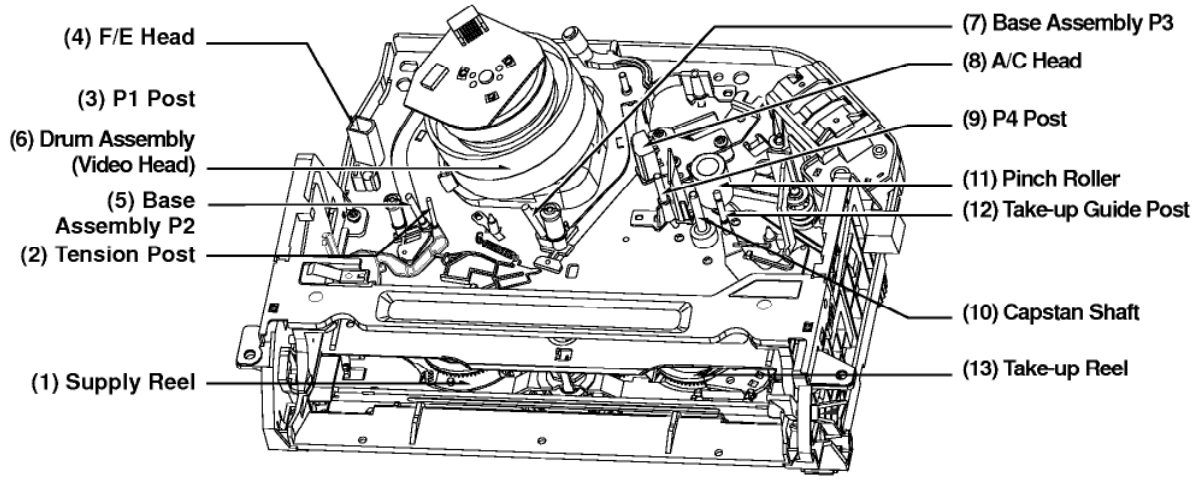


Fig. C-9-3 Tape Transport System

2. Required Maintenance

The recording density of a VCR(VCP) is much higher than that of an audio tape recorder. VCR(VCP) components must be very precise, at tolerances of 1/1000mm, to ensure compatiblity with other VCRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective. To ensure a good picture, periodic inspection and maintenance, including replacement of worn out parts and lubrication, is necessary.

3. Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they vary greatly according to the way in which the customer uses the VCR(VCP), and the environment in which the VCR(VCP) is used.
But, in general home use, a good picture will be maintained if inspection and maintenance is made every 1,000 hours. The table below shows the relation between time used and inspection period.

Table 1

When inspection is necessary / Average hours used per day	About 1 year	About 18 months	About 3 years
One hour	■		
Two hours	■	■	
Three hours	■	■	■

4. Supplies Required for Inspection and Maintence

(1) Grease : Kanto G-311G (Blue) or equivalent
(2) Isopropyl Alcohol or equivalent
(3) Cleaning Patches
(4) Grease : Kanto G-381(Yellow) : Used only for Reel S and Reel T

5) Maintenance Procedure
5-1) Cleaning

(1) Cleaning video head
First use a cleaning tape. If the dirt on the head is too stubborn to remove by tape, use the cleaning patch. Coat the cleaning patch with Isopropyl Alcohol. Touch the cleaning patch to the head tip and gently turn the head(rotating cylinder) right and left.
(Do not move the cleaning patch vertically. Make sure that only the buckskin on the cleaning patch comes into contact with the head. Otherwise, the head may be damaged.)
Thoroughly dry the head. Then run the test tape. If Isopropyl Alcohol remains on the video head, the tape may be damaged when it comes into contact with the head surface.
(2) Clean the tape transport system and drive system, etc, by wiping with a cleaning patch wetted with Isporopyl Alcohol.

NOTES:

① It is the tape transport system which comes into contact with the running tape. The drive system consists of those parts which moves the tape.
② Make sure that during cleaning you do not touch the tape transport system with the tip of a screw driver and no that force is that would cause deforming or damage applied to the system.

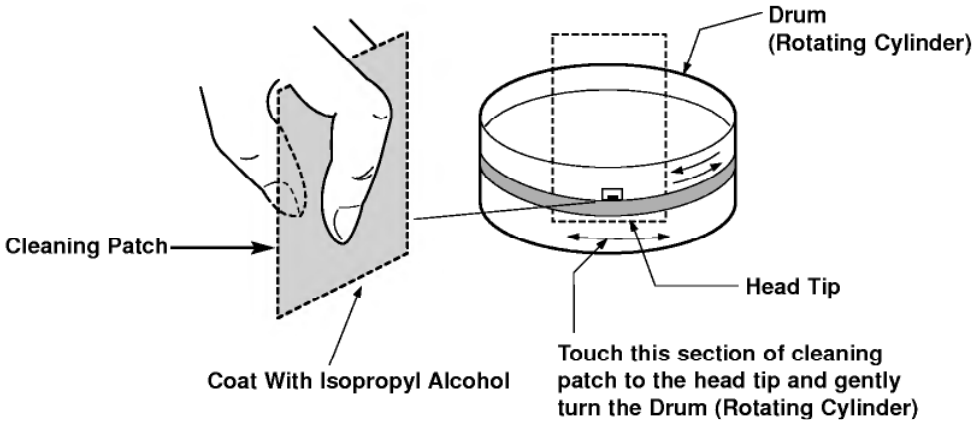

Drum
(Rotating Cylinder)
Cleaning Patch
Head Tip
Coat With Isopropyl Alcohol
Touch this section of cleaning patch to the head tip and gently turn the Drum (Rotating Cylinder)

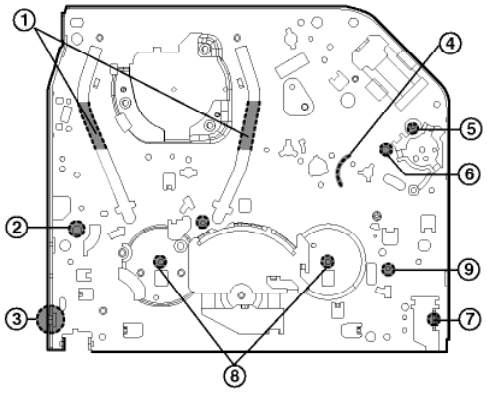
Fig. C-9-4

5-2) Greasing

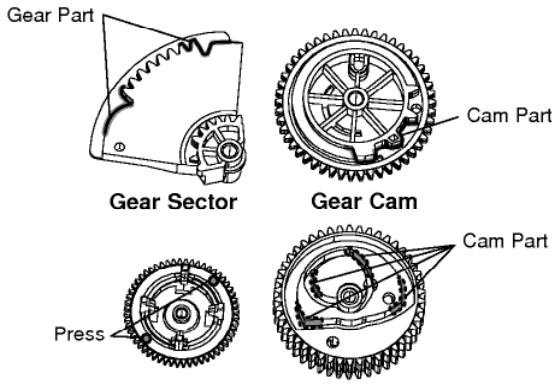
(1) Greasing guidelines
Apply grease, with a cleaning patch. Do not use excess grease. It may come into contact with the tape transport or drive system. Wipe any excess and clean with clean ing patch wetted in Isopropyl Alcohol.

NOTE:Greasing Points

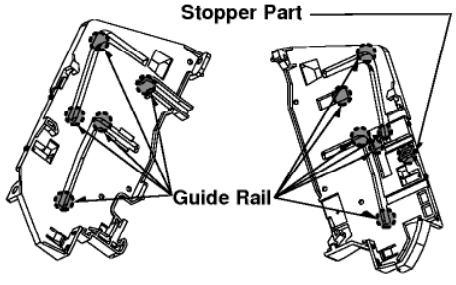
1) Loading Path Inside & Top side
2) Base Tension Boss inside Hole
3) Arm Assembly F/L "U" Groove
4) Arm Take-up Rubbing Section
5) L/D Motor Worm Wheel Part
6) Shaft
7) Arm Assembly F/L of Burning Inside Hole
8) Reel S, T Shaft (G381:Yellow)
9) Brake T Groove



Chassis (Top)



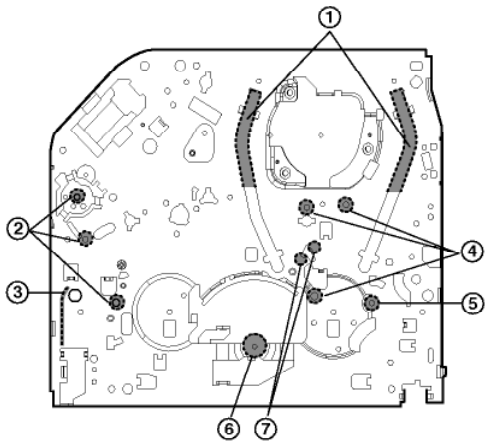
Gear Sector | Gear Cam | Gear Assembly Up/D | Gear Drive



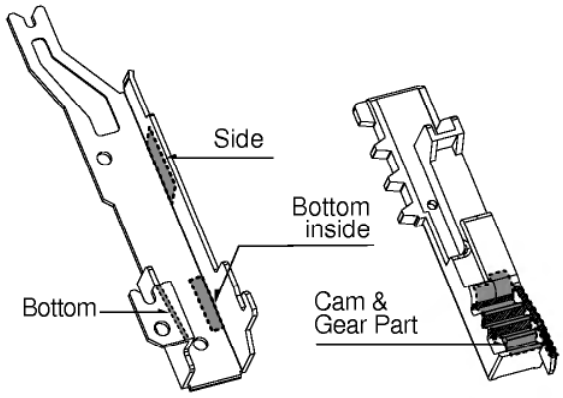
Bracket Side (L) | Bracket Assembly Door

(2) Periodic greasing
Grease specified locations every 5,000 hours.

1) Loading Path Inside & Top side
2) Shaft
3) Gear Rack F/L Moving Section
4) Shaft
5) Lever Tension Groove
6) Clutch Assembly D33 Shaft
7) Brake "S" Rubbing Section



Chassis (Bottom)



Guide Rack F/L | Gear Rack F/L

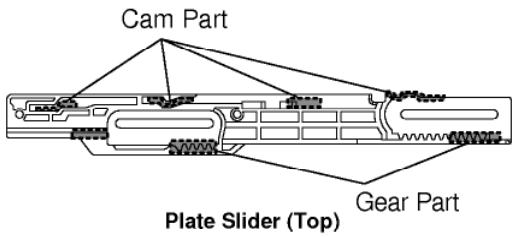


Plate Slider (Top)

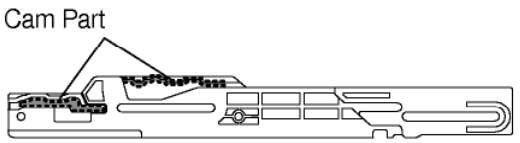
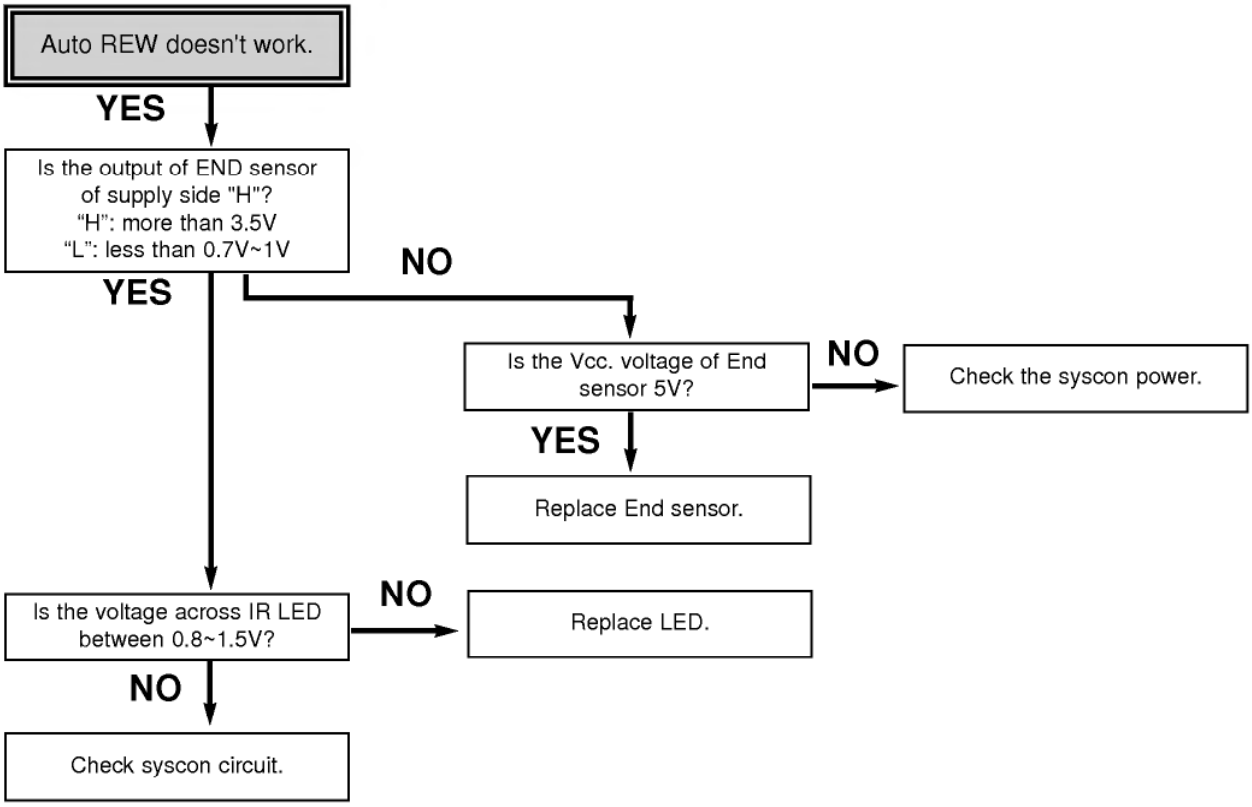


Plate Slider (Bottom)

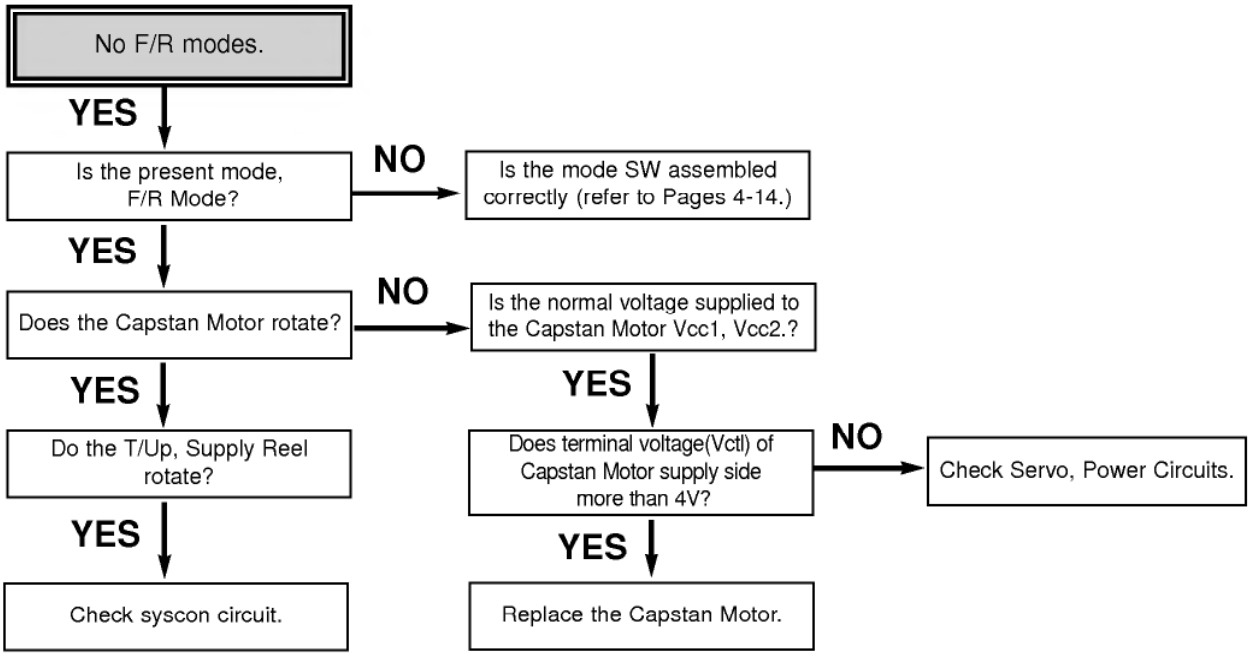
MECHANISM TROUBLESHOOTING GUIDE

1.Deck Mechanism

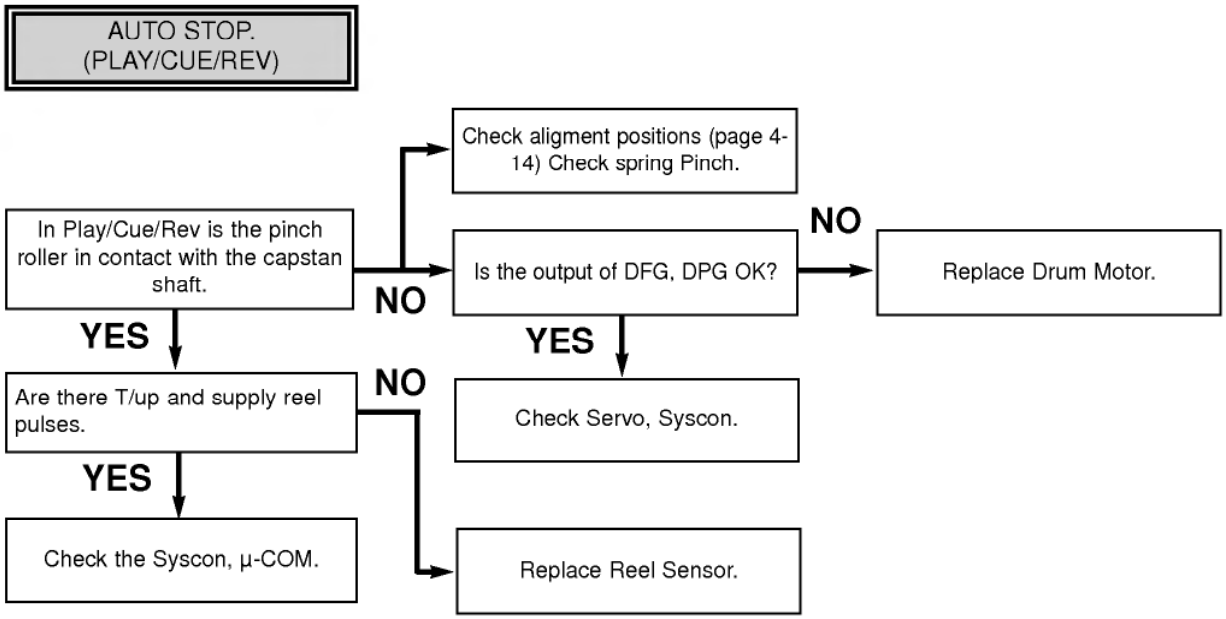
A.



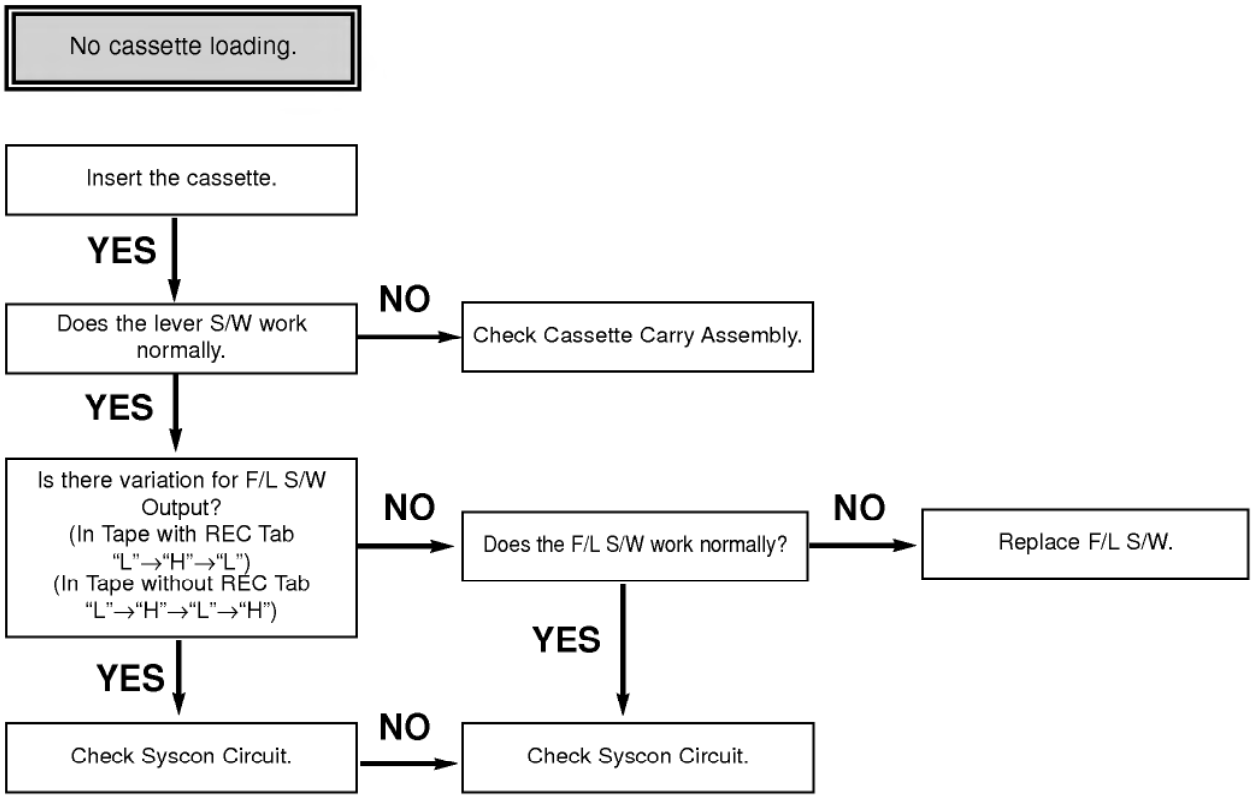
B.



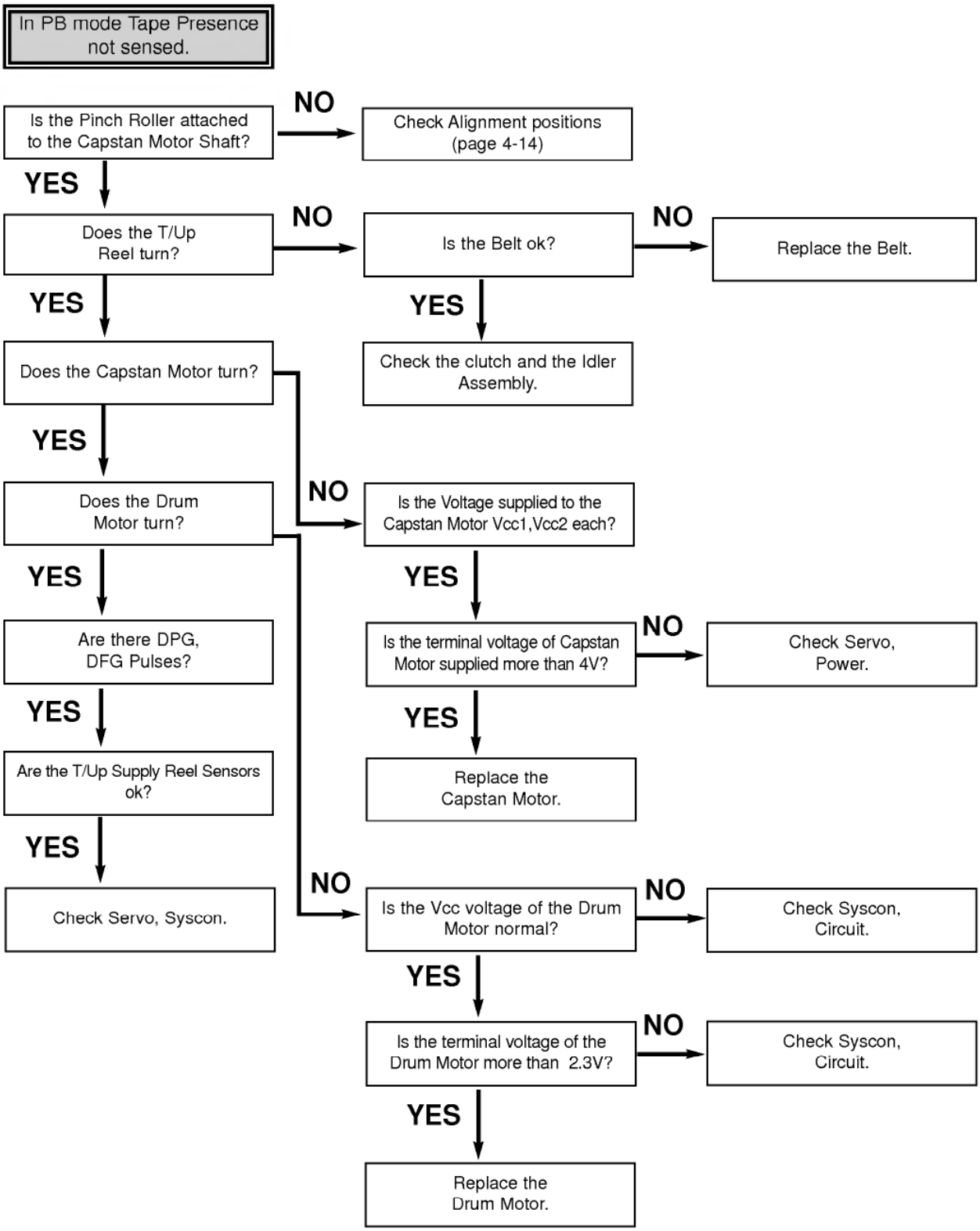
C.


AUTO STOP.
(PLAY/CUE/REV)
In Play/Cue/Rev is the pinch roller in contact with the capstan shaft.
NO
Check aligment positions (page 4-14) Check spring Pinch.
Is the output of DFG, DPG OK?
NO
Replace Drum Motor.
YES
YES
Are there T/up and supply reel pulses.
NO
Check Servo, Syscon.
YES
Check the Syscon, µ-COM.
Replace Reel Sensor.

D.

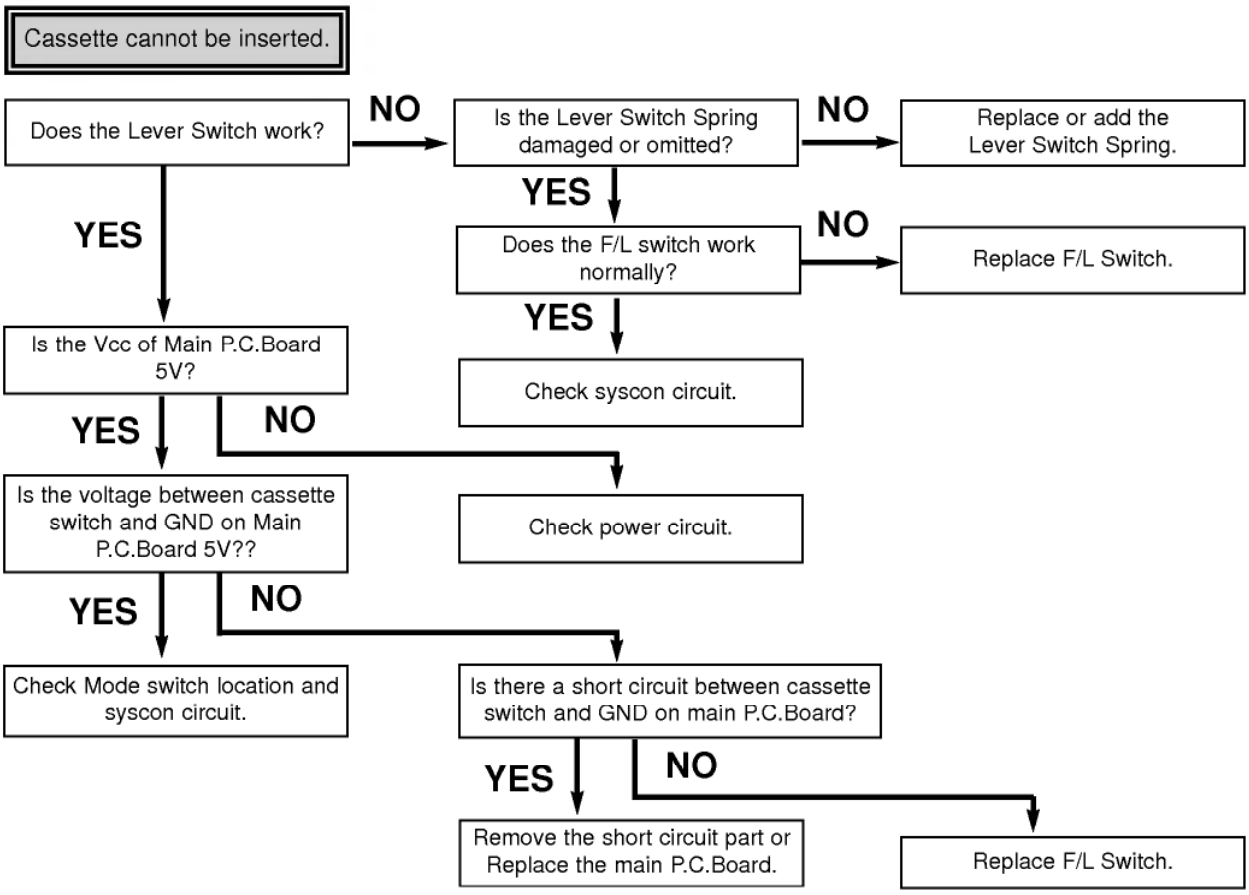

No cassette loading.
Insert the cassette.
YES
Does the lever S/W work normally.
NO
Check Cassette Carry Assembly.
YES
Is there variation for F/L S/W Output?
(In Tape with REC Tab
"L"→"H"→"L")
(In Tape without REC Tab
"L"→"H"→"L"→"H")
NO
Does the F/L S/W work normally?
NO
Replace F/L S/W.
YES
YES
Check Syscon Circuit.
NO
Check Syscon Circuit.

E.

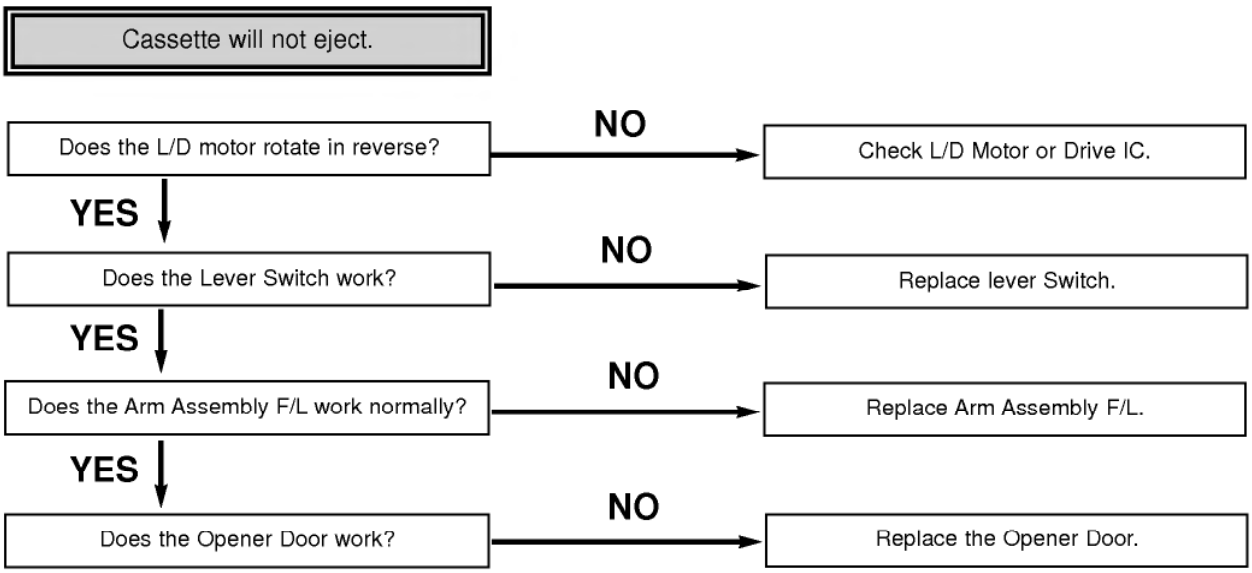

In PB mode Tape Presence not sensed.
Is the Pinch Roller attached to the Capstan Motor Shaft?
NO
Check Alignment positions (page 4-14)
YES
Does the T/Up Reel turn?
NO
Is the Belt ok?
NO
Replace the Belt.
YES
YES
Check the clutch and the Idler Assembly.
Does the Capstan Motor turn?
YES
Does the Drum Motor turn?
NO
Is the Voltage supplied to the Capstan Motor Vcc1,Vcc2 each?
YES
YES
Are there DPG, DFG Pulses?
Is the terminal voltage of Capstan Motor supplied more than 4V?
NO
Check Servo, Power.
YES
YES
Are the T/Up Supply Reel Sensors ok?
Replace the Capstan Motor.
YES
NO
Check Servo, Syscon.
Is the Vcc voltage of the Drum Motor normal?
NO
Check Syscon, Circuit.
YES
Is the terminal voltage of the Drum Motor more than 2.3V?
NO
Check Syscon, Circuit.
YES
Replace the Drum Motor.

2. Front Loading Mechanism

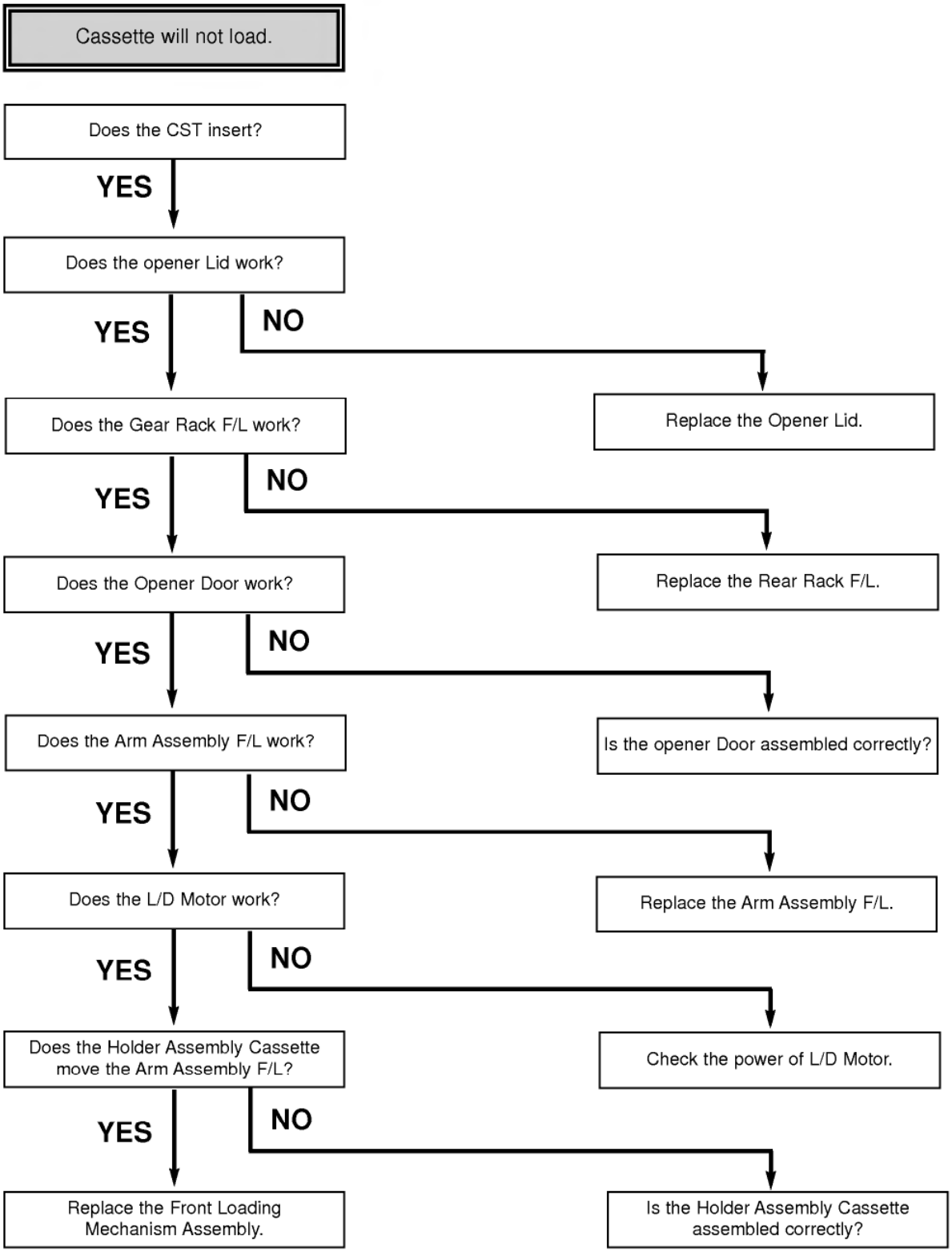
A.


Cassette cannot be inserted.
Does the Lever Switch work?
NO
Is the Lever Switch Spring damaged or omitted?
NO
Replace or add the Lever Switch Spring.
YES
YES
Does the F/L switch work normally?
NO
Replace F/L Switch.
YES
Is the Vcc of Main P.C.Board 5V?
Check syscon circuit.
YES
NO
Is the voltage between cassette switch and GND on Main P.C.Board 5V??
Check power circuit.
YES
NO
Check Mode switch location and syscon circuit.
Is there a short circuit between cassette switch and GND on main P.C.Board?
YES
NO
Remove the short circuit part or Replace the main P.C.Board.
Replace F/L Switch.

B.

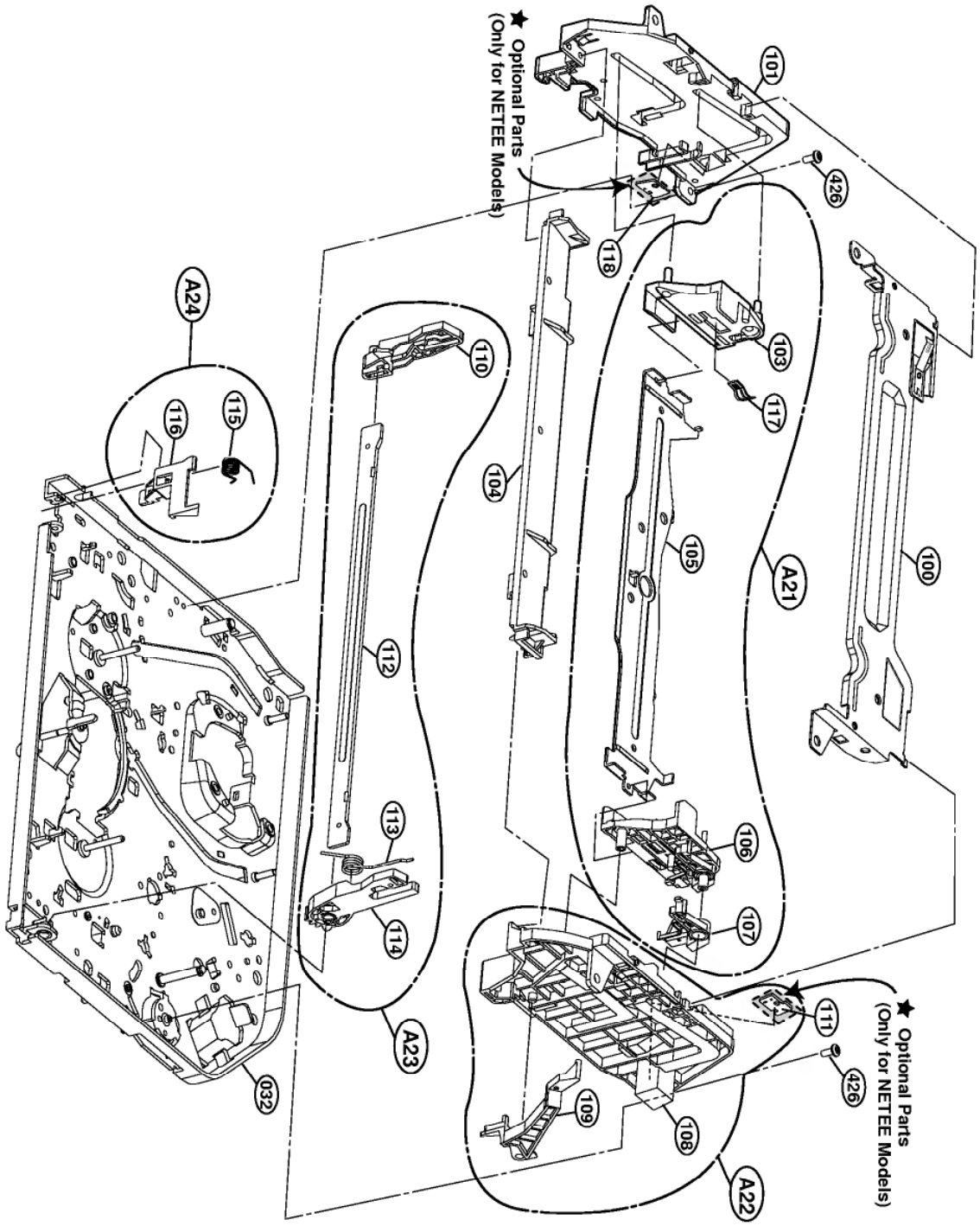


C.

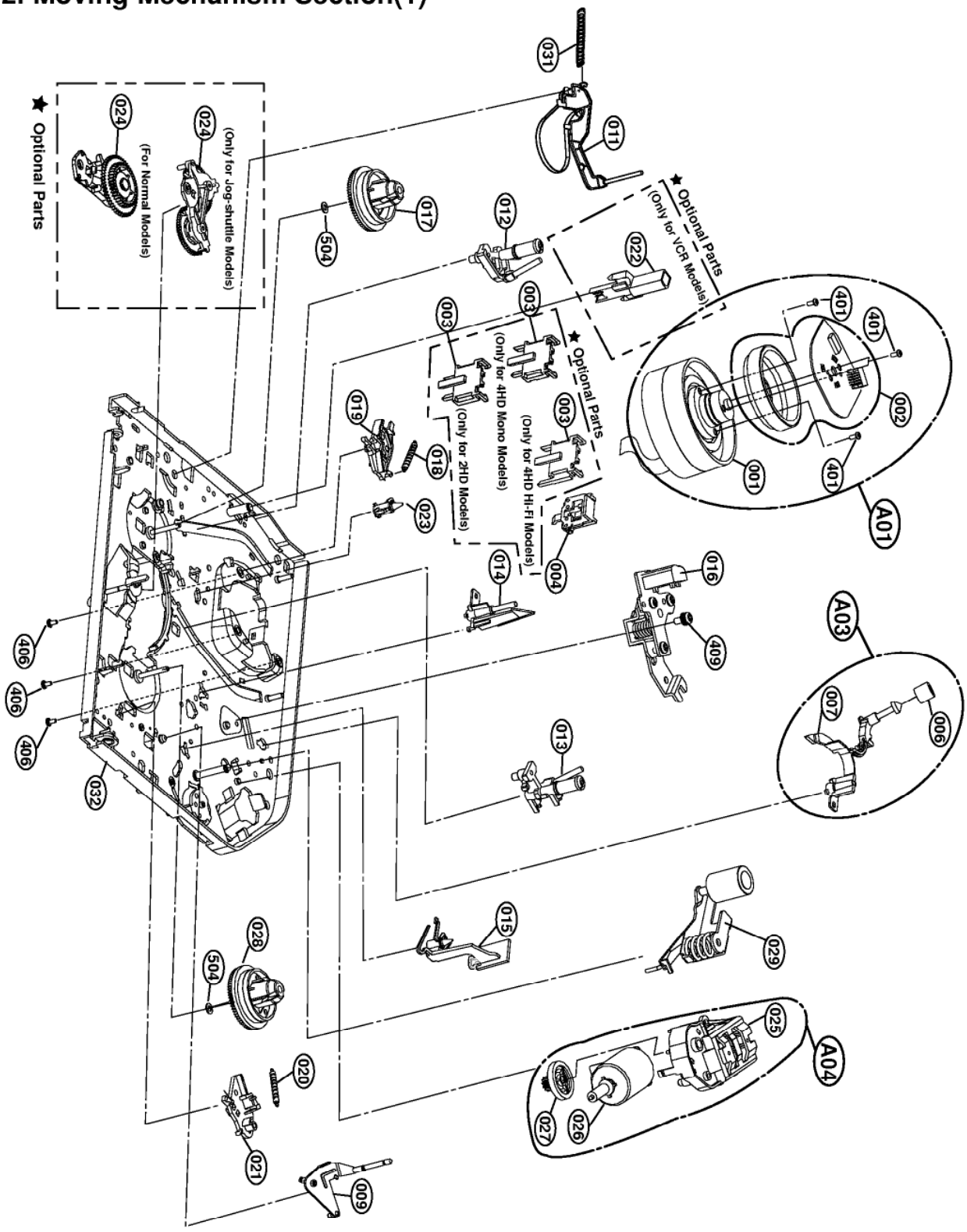

Cassette will not load.
Does the CST insert?
YES
Does the opener Lid work?
YES
NO
Replace the Opener Lid.
Does the Gear Rack F/L work?
YES
NO
Replace the Rear Rack F/L.
Does the Opener Door work?
YES
NO
Is the opener Door assembled correctly?
Does the Arm Assembly F/L work?
YES
NO
Replace the Arm Assembly F/L.
Does the L/D Motor work?
YES
NO
Check the power of L/D Motor.
Does the Holder Assembly Cassette move the Arm Assembly F/L?
YES
NO
Is the Holder Assembly Cassette assembled correctly?
Replace the Front Loading Mechanism Assembly.

EXPLODED VIEWS

1. Front Loading Mechanism Section



2. Moving Mechanism Section(1)



EXPLODED VIEWS

3. Moving Mechanism Section(2)